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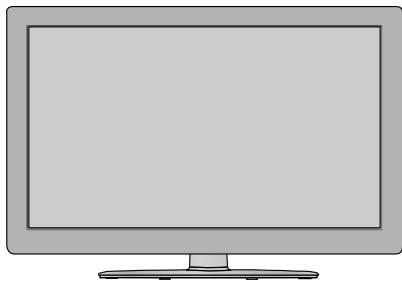
LCD TV SERVICE MANUAL

CHASSIS : LA02D

MODEL : 42LE5400 42LE5400-UC

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL63283410 (1001-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  in the Schematic Diagram and Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer** should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between $1M\Omega$ and $5.2M\Omega$.

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

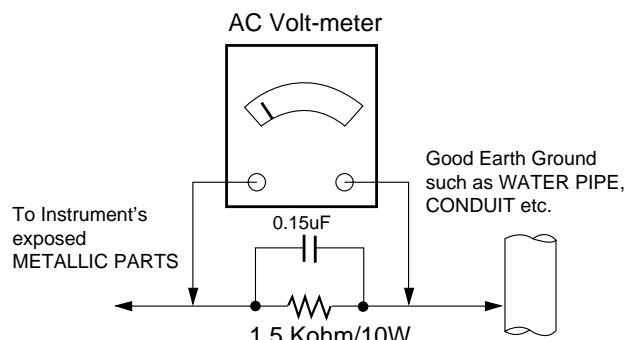
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
 - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
 - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
 - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.

CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
CAUTION: This is a flammable mixture.
Unless specified otherwise in this service manual, lubrication of contacts is not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*
CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called **Electrostatically Sensitive (ES) Devices**. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a small wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
 - a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
 - b. Heat the component lead until the solder melts.
 - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
 - a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
 - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
CAUTION: Work quickly to avoid overheating the circuit board printed foil.
 - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor

Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device

Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.

CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This spec sheet is applied LCD TV with LA02D/E chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature: $25\pm 5^{\circ}\text{C}$, $(77\pm 9^{\circ}\text{F})$, CST: $40\pm 5^{\circ}\text{C}$
- 2) Relative Humidity: $65\pm 10\%$
- 3) Power Voltage : Standard input voltage(100-240V~, 50/60Hz)
 - * Standard Voltage of each product is marked by models
- 4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
- 5) The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

- 1) Performance: LGE TV test method followed
- 2) Demanded other specification
 - Safety : UL, CSA, IEC specification
 - EMC: FCC, ICES, IEC specification
 - Wireless : WirelessHD Specification (Option)

Model	Market	Appliance
XXLE5400-UC	North America	Safety : UL1492, CSA C22.2.No.1, EMC : FCC Class B, IEC Class B Wireless HD: Option
XXLE5500-UA		
XXLE7500-UC		

4. General Specification(TV)

No	Item		Specification		Remark	
1	Receivable System		1) ATSC / NTSC-M			
2	Available Channel		VHF : 02 ~ 13 UHF : 14 ~ 69 DTV : 02 ~ 69 CATV : 01 ~ 135 CADTV : 01 ~ 135			
3	Input Voltage		1) AC 100 ~ 240V 50/60Hz			
4	Market		North America			
5	Screen Size	Edge LED	42 inch Wide(1920x1080)	FHD + 120Hz	42LE5500-UA/ 42LE7500-UC	
			47 inch Wide(1920x1080)	FHD + 120Hz	47LE5500-UA/ 47LE7500-UC	
		IOP LED	55 inch Wide(1920x1080)	FHD + 120Hz	55LE5500-UA/ 55LE7500-UC	
	IOP LED	47 inch Wide(1920x1080)	FHD+TM240Hz	47LE8500-UA		
		55 inch Wide(1920x1080)	FHD+TM240Hz	55LE8500-UA		
6	Aspect Ratio		16:9			
7	Tuning System		FS			
8	LCD Module	Edge LED	LC420EUH-SCA1 (Slim Edge Led)	LGD	42LE5500-UA/42LE7500-UC	
			LC470EUH-SCA1 (Slim Edge Led)	LGD	47LE5500-UA/47LE7500-UC	
		IOP LED	LC550EUB-SCA1 (Slim Edge Led)	LGD	55LE5500-UA/ 55LE7500-UC	
			0MUK-SCA1 (LCD Panel)	LGD	47LE8500-UA	
			LUTHS470EALZD (Back Light Assy)	Heesung		
9	Operating Environment		LC550MUK-SCA1 (LCD Panel)	LGD	55LE8500-UA	
			LC55030011A (Back Light Assy)	Razen		
10	Storage Environment		Temp : 0 ~ 40 deg Humidity : ~ 80 %			
			Temp : -20 ~ 60 deg Humidity : -85 %			

5. Chrominance & Luminance

5.1. 42LE5500-UA/42LE7500-UC/42LE5400-UC

No.	Item		Min	Typ	Max	Unit	Remarks
1	Max Luminance (Center 1-point / Full White Pattern)		360	450		cd/m ²	
2	Luminance uniformity				1.3		5point
3	Color coordinate (Default)	RED	X	Typ. -0.03	0.647	Typ. +0.03	
			Y		0.332		
		GREEN	X		0.309		
			Y		0.601		
		BLUE	X		0.149		
			Y		0.059		
		WHITE	X		0.279		
			Y		0.292		
		Module		1000:1	1400:1		
		DCR			5,000,000:1		42LE5500-UA / 42LE7500-UC
					3,000,000:1		42LE5400-UC
6	Color Temperature	Cool		0.267	0.269	0.271	13000K The W/B Tolerance is ±0.015 for picture quality by DQA.
				0.271	0.273	0.275	
		Medium		0.283	0.285	0.287	
				0.291	0.293	0.295	
		Warm		0.311	0.313	0.315	9300K 6500K
				0.327	0.329	0.331	

6. Component Video Input (Y, C_B/P_B, C_R/P_R)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed
1.	720*480	15.73	60	13.5135	SDTV ,DVD 480I
2.	720*480	15.73	59.94	13.5	SDTV ,DVD 480I
3.	720*480	31.50	60	27.027	SDTV
4.	720*480	31.47	59.94	27.0	SDTV
5.	1280*720	45.00	60.00	74.25	HDTV
6.	1280*720	44.96	59.94	74.176	HDTV
7.	1920*1080	33.75	60.00	74.25	HDTV
8.	1920*1080	33.72	59.94	74.176	HDTV
9.	1920*1080	67.500	60	148.50	HDTV
10.	1920*1080	67.432	59.94	148.352	HDTV
11.	1920*1080	27.000	24.000	74.25	HDTV
12.	1920*1080	26.97	23.976	74.176	HDTV
13.	1920*1080	33.75	30.000	74.25	HDTV
14.	1920*1080	33.71	29.97	74.176	HDTV

7. RGB Input (PC)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
	PC				DDC	
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.94	25.17	VESA(VGA)	O
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1280*768	47.776	59.87	79.50	CVT(WXGA)	X
7.	1360*768	47.712	60.015	85.50	VESA(WXGA)	X
8.	1280*1024	63.981	60.020	108.00	VESA(SXGA)	O
9.	1920*1080	66.587	59.934	148.5	HDTV 1080P	O

8. HDMI input (PC/DTV)

No	Resolution	H-freq(kHz)	V-freq.(kHz)	Pixel clock	Proposed	
	PC					DDC
1.	640*350	31.468	70.09	25.17	EGA	X
2.	720*400	31.469	70.08	28.32	DOS	O
3.	640*480	31.469	59.94	25.17	VESA(VGA)	O
4.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
5.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
6.	1280*768	47.776	59.870	79.50	CVT(WXGA)	X
7.	1360*768	47.712	60.015	85.50	VESA(WXGA)	X
8.	1280*1024	63.981	60.020	108.00	VESA(SXGA)	O
9.	1920*1080	67.5	60	148.5	HDTV 1080P	O
	DTV					
1	720*480	31.5	60	27.027	SDTV 480P	
2	720*480	31.47	59.94	27.00	SDTV 480P	
3	1280*720	45.00	60.00	74.25	HDTV 720P	
4	1280*720	44.96	59.94	74.176	HDTV 720P	
5	1920*1080	33.75	60.00	74.25	HDTV 1080I	
6	1920*1080	33.72	59.94	74.176	HDTV 1080I	
7	1920*1080	67.500	60	148.50	HDTV 1080P	
8	1920*1080	67.432	59.939	148.352	HDTV 1080P	
9	1920*1080	27.000	24.000	74.25	HDTV 1080P	
10	1920*1080	26.97	23.976	74.176	HDTV 1080P	
11	1920*1080	33.75	30.000	74.25	HDTV 1080P	
12	1920*1080	33.71	29.97	74.176	HDTV 1080P	

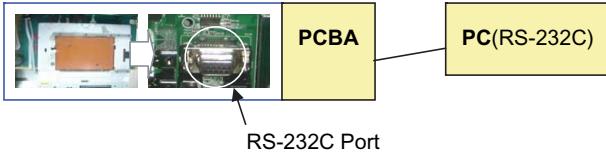
4.2 MAC Address and ESN Key Write

4.2.1 Equipment & Condition

- Play file: Serial.exe
- MAC Address edit
- Input Start / End MAC address

4.2.2 Download method

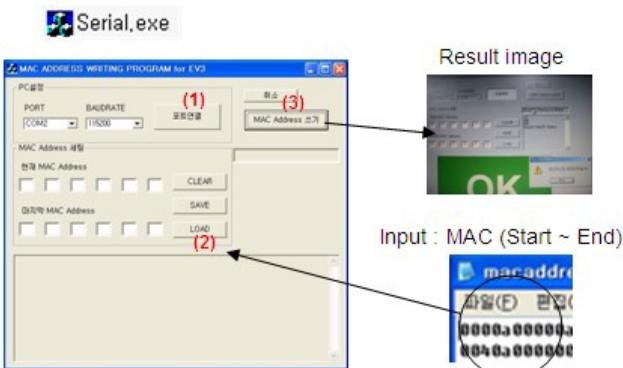
4.2.2.1 Communication Prot connection



Connect: PCBA Jig-> RS-232C Port== PC-> RS-232C Port

4.2.2.2 MAC Address Download

- Com 1,2,3,4 and 115200(Baudrate)
- Port connection button click(1)



- Load button click(2) for MAC Address write.
- Start MAC Address write button(3)
- Check the OK Or NG

4.2.2.3 Input the ESN Key

- download Model sending Key file
- input by 1 by SET so as not to be duplicated

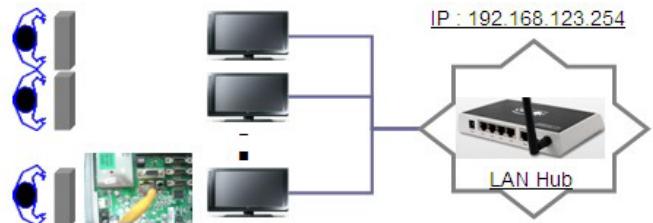
RS-232c ESN Key D/L to PCBA.



4.3 LAN PORT + ESN INSPECTION (Automatic IP)

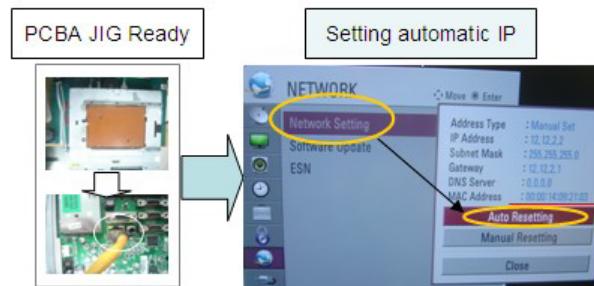
4.3.1 Equipment & Condition

- Each other connection to LAN Port of IP Hub and Jig



4.3.2 LAN inspection solution

- LAN Port connection with PCB
- Network setting at MENU Mode of TV
- setting automatic IP
- Setting state confirmation
- If automatic setting is finished, you confirm IP and MAC Address.



4.3.3 ESN Key confirmation

- confirm Key input Data at ESN MENU Mode



4.4 LAN PORT INSPECTION(PING TEST)

Connect: SET-> LAN Port == PC-> LAN Port



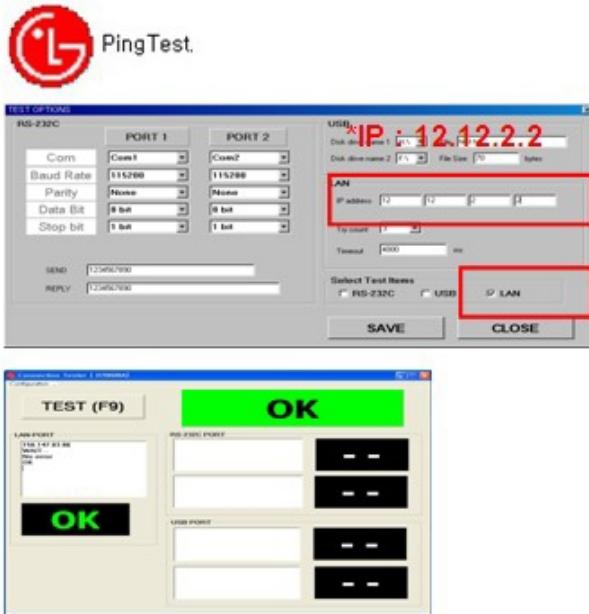
4.4.1. Equipment setting

- 1) Play the LAN Port Test PROGRAM.
- 2) Input IP set up for an inspection to Test Program.

*IP Number : 12.12.2.2

4.4.2. LAN PORT inspection (PING TEST)

- 1) Play the LAN Port Test Program.
- 2) connect each other LAN Port Jack.
- 3) Play Test (F9) button and confirm OK Message.
- 4) remove LAN CABLE



4.5 EDID/DDC Download

(1) Overview

It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

(2) Equipment

- Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.
- Adjust by using remote controller.

(3) Download method

- Press Adj. key on the Adj. R/C,
- Select EDID D/L menu.
- By pressing Enter key, EDID download will begin
- If Download is successful, OK is display, but If Download is failure, NG is displayed.
- If Download is failure, Re-try downloads.

Caution) When EDID Download, must remove RGB/HDMI Cable.

(4) EDID DATA

HDMI Port 1

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	14	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	02	3A	80	18	71	38	20	40	58	2C	
40	45	00	A0	5A	00	00	00	1E	01	10	00	72	51	00	1E	20
50	6E	28	55	00	A0	5A	00	00	1E	00	00	00	00	00	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	04

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1C	F1	47	10	22	20	05	84	03	02	23	09	07	07
10	67	03	0C	00	10	00	88	20	E3	05	03	01	02	3A	80	18
20	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	00	1E	01
30	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00	9E
40	01	1D	00	72	51	00	1E	20	6E	28	55	00	A0	5A	00	00
50	00	1E	8C	04	00	8A	20	E0	20	10	10	3E	96	00	A0	5A
60	00	00	00	18	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	CC

HDMI Port 2

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	14	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	02	3A	80	18	71	38	20	40	58	2C	
40	45	00	A0	5A	00	00	00	1E	01	10	00	72	51	00	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	00	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	04

EDID Block 1, Bytes 128-255 [80H-FFH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	02	03	1C	F1	47	10	22	20	05	84	03	02	23	09	07	07
10	67	03	0C	00	20	00	88	20	E3	05	03	01	02	3A	80	18
20	71	38	2D	40	58	2C	04	05	A0	5A	00	00	00	1E	01	1D
30	80	18	71	1C	16	20	58	2C	25	00	A0	5A	00	00	00	9E
40	01	1D	00	72	51	00	1E	20	6E	28	55	00	A0	5A	00	00
50	00	1E	8C	04	00	8A	20	E0	20	10	10	3E	96	00	A0	5A
60	00	00	00	18	26	36	80	A0	70	38	1F	40	30	20	25	00
70	A0	5A	00	00	00	1A	00	00	00	00	00	00	00	00	00	BC

HDMI Port 3

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	14	01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	02	3A	80	18	71	38	20	40	58	2C	
40	45	00	A0	5A	00	00	00	1E	01	10	00	72	51	00	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	00	00	39
60	3F	1F	52	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	04

HDMI Port 4

EDID Block 0, Bytes 0-127 [00H-7FH]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	14	01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	02	3A	80	18	71	38	20	40	58	2C	
40	45	00	A0	5A	00	00	00	1E	01	10	00	72	51	00	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	00	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	00	1D

5. Final Assembly Adjustment

5.1. White Balance Adjustment

(1) Overview

- W/B adj. Objective & How-it-works
 - Objective: To reduce each Panel's W/B deviation
 - How-it-works: When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
- Adj. condition : normal temperature
 - 1) Surrounding Temperature: $25\pm5^{\circ}\text{C}$
 - 2) Warm-up time: About 5 Min
 - 3) Surrounding Humidity: 20% ~ 80%

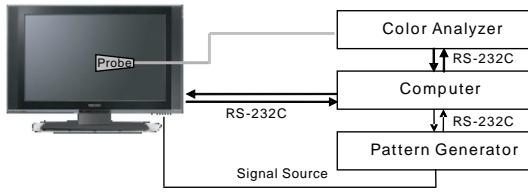
(2) Adj. condition and cautionary items

- Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface ($80^{\circ}\sim100^{\circ}$)
- Aging time
 - 1) After Aging Start, Keep the Power ON status during 5 Minutes.
 - 2) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

(3) Equipment

- 1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED : CH14)
- 2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- 3) Adjust Remocon
- 4) Video Signal Generator MSPG-925F 720p/216-Gray (Model:217, Pattern:78)
 - > Only when internal pattern is not available
- Color Analyzer Matrix should be calibrated using CS-1000

(4) Equipment connection



Connection Diagram of Automatic Adjustment

(5) Adj. Command (Protocol)

- 1) RS-232C Command used during auto-adj.

RS-232C COMMAND			Explanation
CMD	DATA	ID	
Wb	00	00	Begin White Balance adj.
Wb	00	ff	End White Balance adj. (internal pattern disappears)

2) Adjustment Map

	Adj. item	Command (lower case ASCII)		Data Range (Hex.)	
		CMD1	CMD2	MIN	MAX
Cool	R Gain	j	g	00	CD
	G Gain	j	h	00	CD
	B Gain	j	i	00	CD
	R Cut				
	G Cut				
	B Cut				
Medium	R Gain	j	a	00	CD
	G Gain	j	b	00	CD
	B Gain	j	c	00	CD
	R Cut				
	G Cut				
	B Cut				
Warm	R Gain	j	d	00	CD
	G Gain	j	e	00	CD
	B Gain	j	f	00	CD
	R Cut				
	G Cut				
	B Cut				

(6) Adj. method

- Auto adj. method
 - 1) Set TV in adj. mode using POWER ON key
 - 2) Zero calibrate probe then place it on the center of the Display
 - 3) Connect Cable(RS-232C)
 - 4) Select mode in adj. Program and begin adj.
 - 5) When adj. is complete (OK Sing), check adj. status pre mode (Warm, Medium, Cool)
 - 6) Remove probe and RS-232C cable to complete adj.

(7) Reference (White Balance Adj. coordinate and color temperature)

- Luminance: 216 Gray
- Standard color coordinate and temperature using CS-1000

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269	0.273	13000K	0.0000
MEDIUM	0.285	0.293	9300K	0.0000
WARM	0.313	0.329	6500K	0.0000

- Standard color coordinate and temperature using CA-210 (CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500K	0.0000

- Standard color coordinate and temperature using CA-210(CH 14) – by aging time
- 1) Edge/IOP LED models

GP2	Aging time (Min)	Cool		Medium		Warm	
		x	y	x	y	x	y
1	0-2	276	285	292	305	315	334
2	3-5	274	282	290	302	313	332
3	6-9	273	280	289	300	312	330
4	10-19	272	278	288	298	311	328
5	20-35	271	276	287	296	310	326
6	36-49	269	274	286	294	309	324
7	50-79	269	273	286	293	308	323
8	Over 80	269	273	285	293	308	323

5.2. Tool Option setting & Inspection per countries

(1) Overview

- Tool option selection is only done for models in Non-USA North America due to rating
- Applied model: LA02D and LA02E Chassis applied to CANADA and MEXICO

(2) Country Group selection

- Press ADJ key on the Adj. R/C, and then select Country Group Menu
- Depending on destination, select KR or US, then on the lower Country option, select US, CA, MX. Selection is done using +, - KEY

(3) Tool Option Inspection

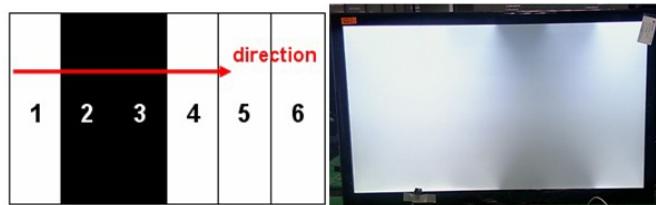
- Press Adj. key on the Adj. R/C, and then check Tool option.

Model	Tool 1	Tool 2	Tool 3	Tool 4	Tool 5
42LE5500					
47LE5500					
55LE5500					
42LE7500					
47LE7500					
55LE7500					
32LE5400					
42LE5400					
47LE5400					
55LE5400					
60LE5400					
47LE8500	33088	30291	56380	4589	1803
55LE8500	45376	30291	56380	4589	1803

5.3. Local dimming inspection (Optional)

5.3.1. Edge LED models with local dimming

- (1) Press 'TILT" key of the Adj. R/C and check moving patterns. The black bar patterns moves from left to right. If local dimming function does not work, a whole screen shows full white.



5.3.2. IOP LED models with local dimming

- (1) Press 'TILT" key of the Adj. R/C and check moving patterns. The black cross-bar patterns moves from top-left to Bottom-right. If local dimming function does not work, a whole screen shows full white.



5.4. Ship-out mode check (In-stop)

- After final inspection, press In-Stop key of the Adj. R/C and check that the unit goes to Stand-by mode.

6. GND and Hi-pot Test

6.1. Method

- 6.1.1. GND & HI-POT auto-check preparation
 - (1) Check the POWER CABLE and SIGNAL CABLE insertion condition
- 6.1.2. GND & HI-POT auto-check
 - (1) Pallet moves in the station. (POWER CORD / AV CORD is tightly inserted)
 - (2) Connect the AV JACK Tester.
 - (3) Controller (GWS103-4) on.
 - (4) GND Test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, execute next process (Hi-pot test).
(Remove A/V CORD from A/V JACK BOX)
 - (5) HI-POT test (Auto)
 - If Test is failed, Buzzer operates.
 - If Test is passed, GOOD Lamp on and move to next process automatically.

6.2. Checkpoint

- TEST voltage
 - GND: 1.5KV/min at 100mA
 - SIGNAL: 3KV/min at 100mA
- TEST time: 1 second
- TEST POINT
 - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
 - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5mA rms

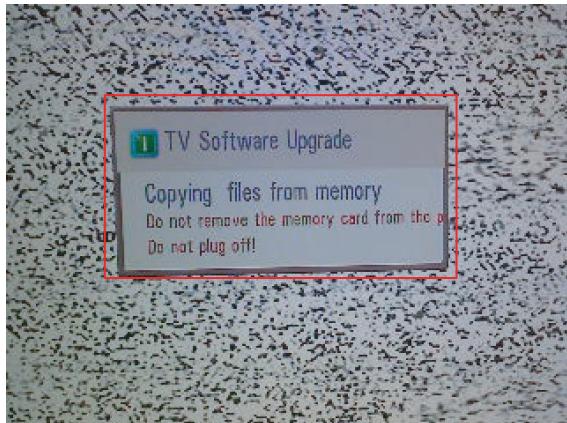
APPENDIX

1. Tool option menu

1 st level	2nd level	Condition	Remark
0. Tool Option1	Inch		
	Tool		
	Maker		
	Module Rev.		
1. Tool Option2	HDMI Count		
	HDMI Switch IC		
	HDMI Position		
	Component Count		
	CompPosition		
	CompAV Common		
	Comp Swap		
	Scart Count		
	RCA AV Count		
	RCA AV Position		
	RGB Count		
	USB Count		
2. Tool Option3	EMF(JPEG, MP3)		
	Divx		
	Bluetooth		
	Digital Eye		
	Headphone		
	E-Manual		
	Audio Amp.		
	Backlight Type		
	Wireless Ready		
	Boot Logo		
	DVR Ready		
	Instant Boot		
	Local Dimming		
	CIFS		
3. Tool Option4	DLNA		
	THX		
	Digital Demod		
	Analog Demod		
	THX Media Director		
	Picture Wizard		
	ISF		
	Energy Star		
	Motion Remote		
4. Tool Option5	Channel Browser		
	TV Link		
	USB Hub Count		
	Mirror Mode		
	Orange Service		
	NetCast Service		
	PSU Power		

2. USB S/W Download (option)

- (1) Put the USB Stick to the USB socket
- (2) Automatically detecting update file in USB Stick
 - If your downloaded program version in USB Stick is Low, it didn't work.
But your downloaded version is High, USB data is automatically detecting
- (3) Show the message "Copying files from memory"



- (4) Updating is starting.



- (5) Updating Completed, The TV will restart automatically
- (6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
 - * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust TOOL OPTION again.

- 1) Push "IN-START" key in service remote controller.
- 2) Select "Tool Option 1" and Push "OK" button.
- 3) Punch in the number. (Each model has their number

5. Optional adjustments (Optional)

5.1. Manual ADC Calibration

5.1.1. Equipment & Condition

- (1) Adjustment Remocon
- (2) 801GF (802B, 802F, 802R) or MSPG925FA Pattern Generator
 - Resolution: 480i Comp1 (MSPG-925FA: model-209, pattern-65)
 - Resolution: 1080p Comp1 (MSPG-925FA: model-225, pattern-65)
 - Resolution : 1080p RGB (MSPG-925FA: model-225, pattern-65)
 - Pattern : Horizontal 100% Color Bar Pattern
 - Pattern level: 0.7 ± 0.1 Vp-p

5.1.2 Adjust method

5.1.3.1 ADC 480i/1080p Comp1, RGB

- (1) Check connected condition of Comp1/RGB cable to the equipment
- (2) Give a 480i Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA ->Model: 209, Pattern: 65)
- (3) Change input mode as Component1 and picture mode as "Standard"
- (4) Press the In-start Key on the ADJ remote after at least 1 min of signal reception. Then, select 7.External ADC. And Press OK or Right Button for going to sub menu.
- (5) Press OK in Comp 480i menu
- (6) Give a 1080p Mode, Horizontal 100% Color Bar Pattern to Comp1. (MSPG-925FA Model: 225, Pattern: 65)
- (7) Press OK in Comp 1080p menu
- (8) Perform (6) and (7) in RGB-PC
- (9) If ADC Comp is successful, "ADC Component Success" is displayed.
- If ADC calibration is failure, "ADC Component Fail" is displayed.
- (10) If ADC calibration is failure, after rechecking ADC pattern or condition, retry calibration
- (11) If ADC RGB calibration is successful, "ADC RGB Success" is displayed.
- If ADC calibration is failure, "ADC RGB Fail" is displayed.
- (12) If ADC calibration is failure, after recheck ADC pattern or condition, retry calibration

5.2. Manual White balance Adjustment

5.2.1. Adj. condition and cautionary items

- (1) Lighting condition in surrounding area surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
- (2) Probe location: Color Analyzer (CA-210) probe should be within 10cm and perpendicular of the module surface (80°~ 100°)
- (3) Aging time
 - 1) After Aging Start, Keep the Power ON status during 5 Minutes.
 - 2) In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

5.2.2. Equipment

- (1) Color Analyzer: CA-210 (NCG: CH 9 / WCG: CH12 / LED: CH14)
- (2) Adj. Computer (During auto adj., RS-232C protocol is needed)
- (3) Adjust Remocon
- (4) Video Signal Generator MSPG-925F 720p/216-Gray (Model: 217, Pattern: 78)

5.2.3. Adjustment

- (1) Set TV in Adj. mode using POWER ON
- (2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
- (3) Press ADJ key EZ adjust using adj. R/C 6. White-Balance then press the cursor to the right (KEY G).
When KEY(G) is pressed 216 Gray internal pattern will be displayed.
- (4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
- (5) Adj. is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

- If internal pattern is not available, use RF input. In EZ Adj. menu 6.White Balance, you can select one of 2 Test-pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 Gray pattern.

5.3. V-COM Adjustment

- (1) Press the ADJ key of Adjustment remote controller. EZ ADJUST mode.
- (2) Select the "13.V-Com".
- (3) At the V-Com adjustment Mode use **F G** Key and adjust V-Com voltage. (Refer to Picture)
 - After finding minimum point of Flicker save data using **A** (OK) Key.
- (4) Exit



5.4. Speaker output check

5.4.1. Audio input condition

- (1) RF input: Mono, 1KHz sine wave signal, 100% Modulation
- (2) CVBS, Component: 1KHz sine wave signal (0.4Vrms)
- (3) RGB PC: 1KHz sine wave signal (0.7Vrms)

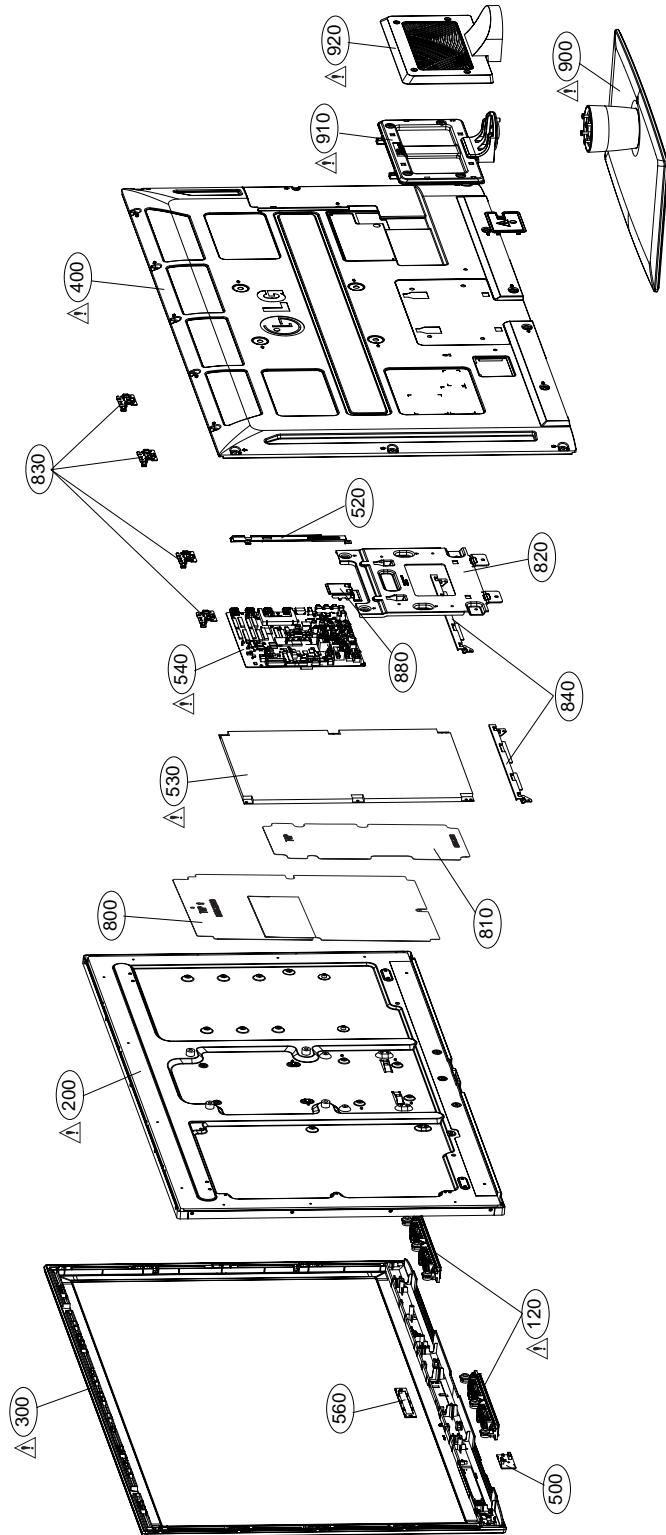
5.4.2. Specification

No	Item	Min	Typ	Max	Unit	Remark
	Audio practical max Output, L/R (Distortion=10% max Output)	9.0	10.0	12.0	W	(1) Measurement condition - EQ/AVL/Clear Voice: Off
		8.5	8.9	9.9	Vrms	(2) Speaker (8Ω Impedance)

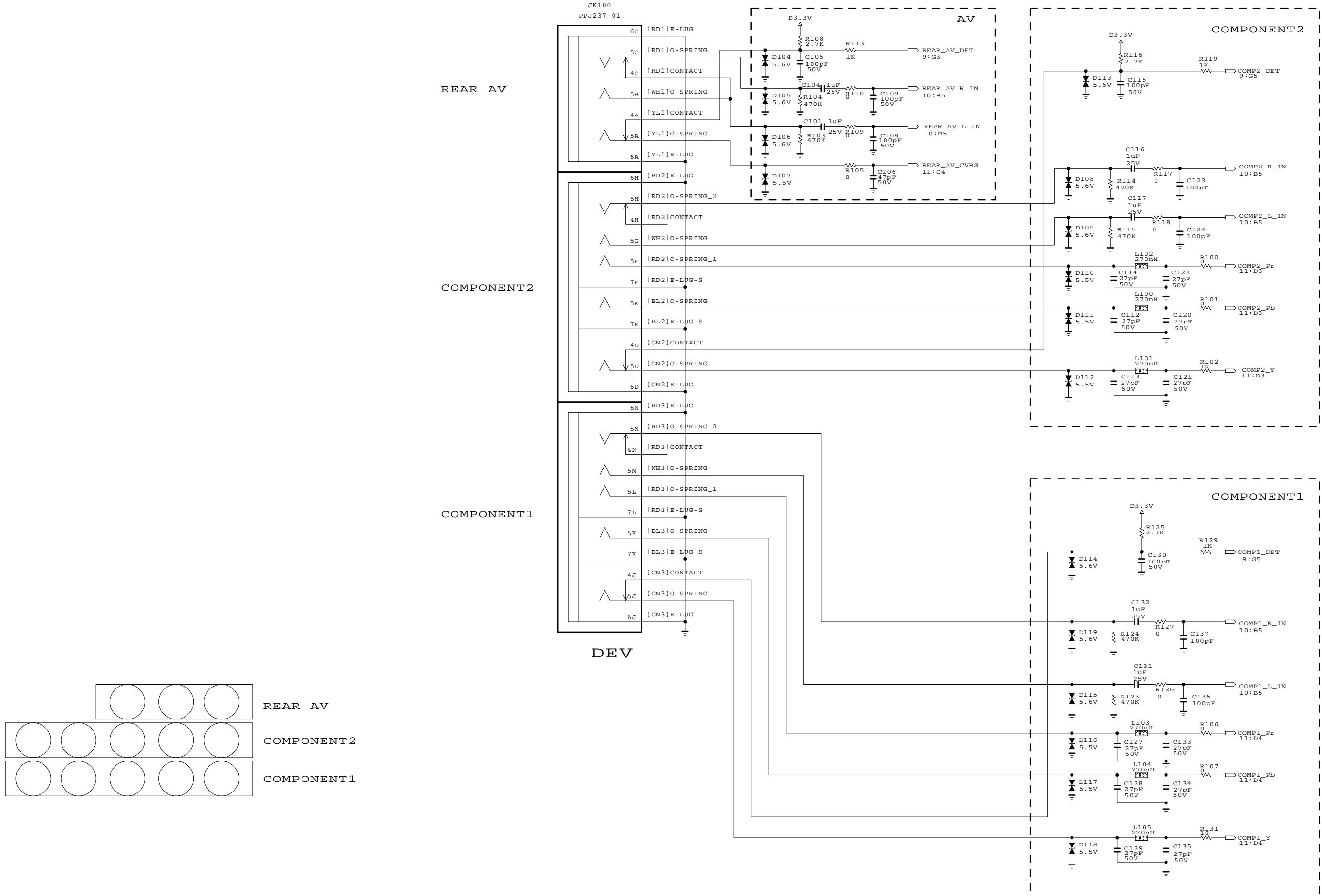
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.

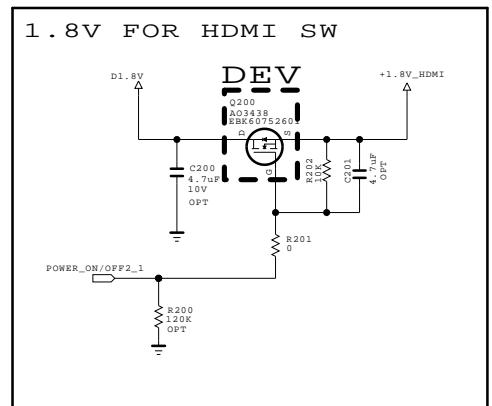


COMPONENT / AV
REAR JACK



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HDMI SWITCH 1.8V POWER



Separated from Common sheet 83
N.America & Korea only use 1.8V control

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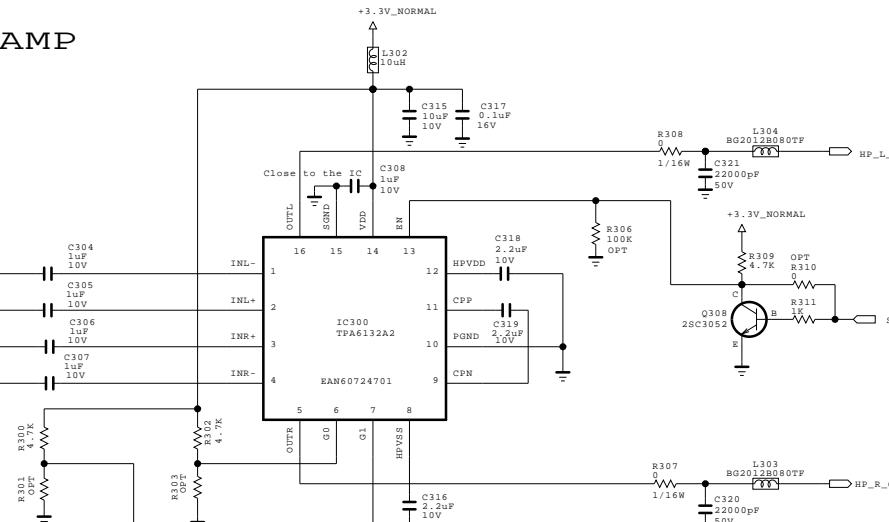
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LG Electronics

LG ELECTRONICS

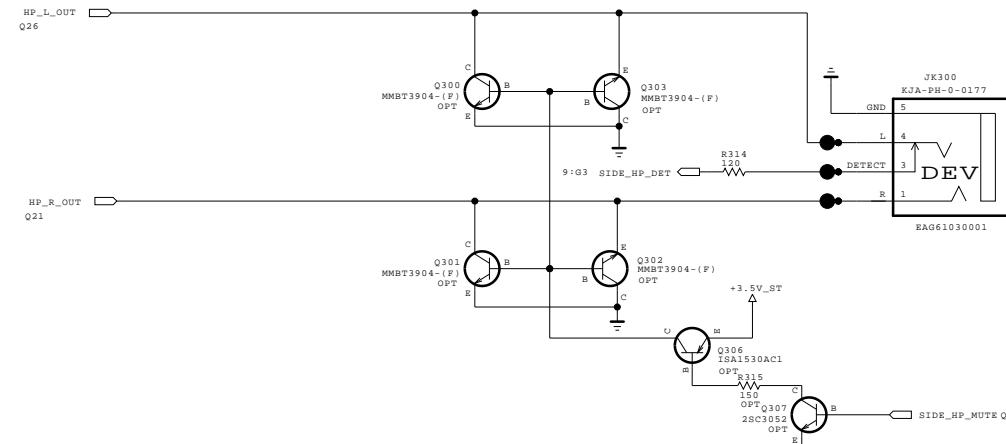
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BLOCK	HDMI_POWER	SHEET	2 / 100

EARPHONE BLOCK

EARPHONE AMP

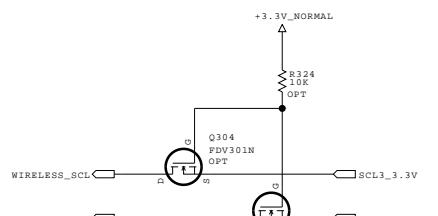


EARPHONE JACK SIDE



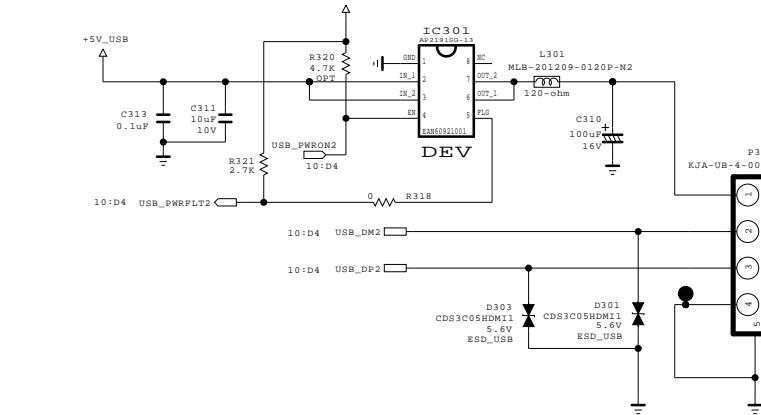
WIRELESS I2C LEVEL SHIFTER

LEVEL SHIFTER



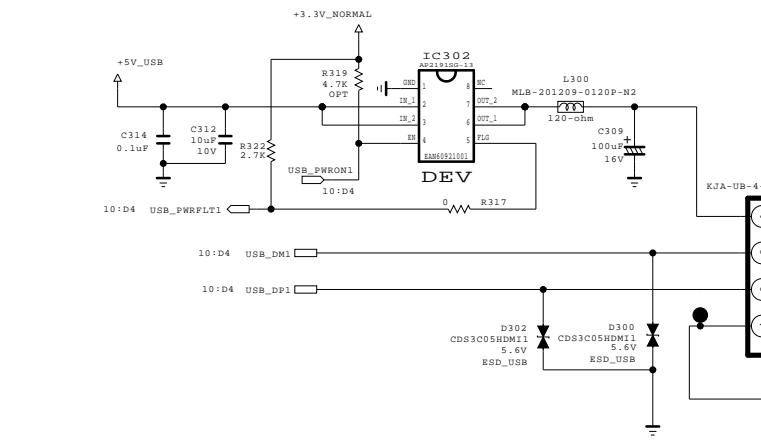
USB BLOC

US



CHANGE USB_PWRFLT PULL-UP FROM 5V TO 3.3V

USB1 (DVR Ready)



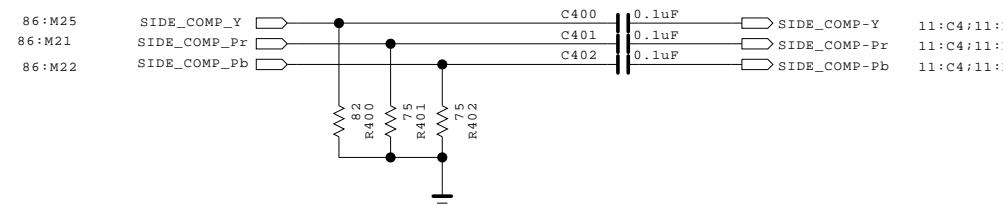
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LGElectro

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MODEL	GP 2_BCM_ATSC	DATE	09 / 10 / xx
BLOCK	USB / EAR - PHONE	SHEET	3 / 100

SIDE COMPONENT LINE



CLOSE TO MAIN IC

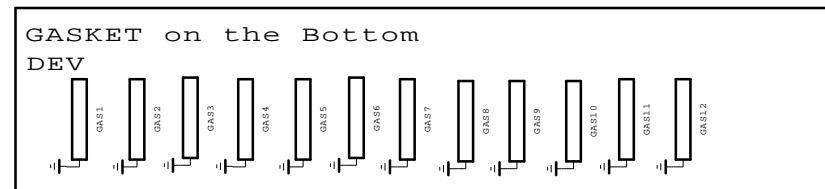
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SECRET
LG Electronics

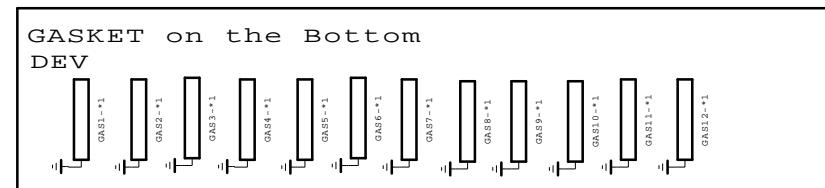
LG ELECTRONICS

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BLOCK	SIDE_GENDER_LINE	SHEET	4 / 100

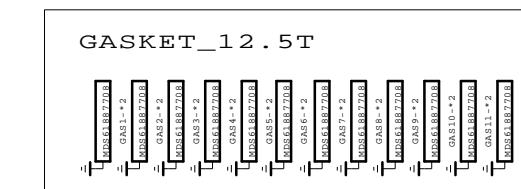
SMD GASKET FOR EMI (8 * 6 * 5.5 FOR LE5400/5500/7500)



SMD GASKET FOR EMI (8 * 6 * 7.5 FOR LE8500)



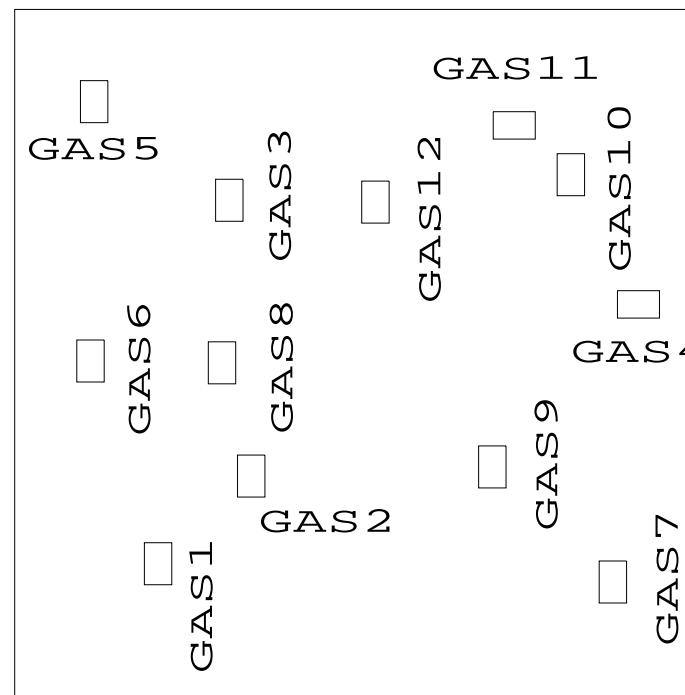
SMD GASKET FOR EMI (8 * 6 * 12.5T)



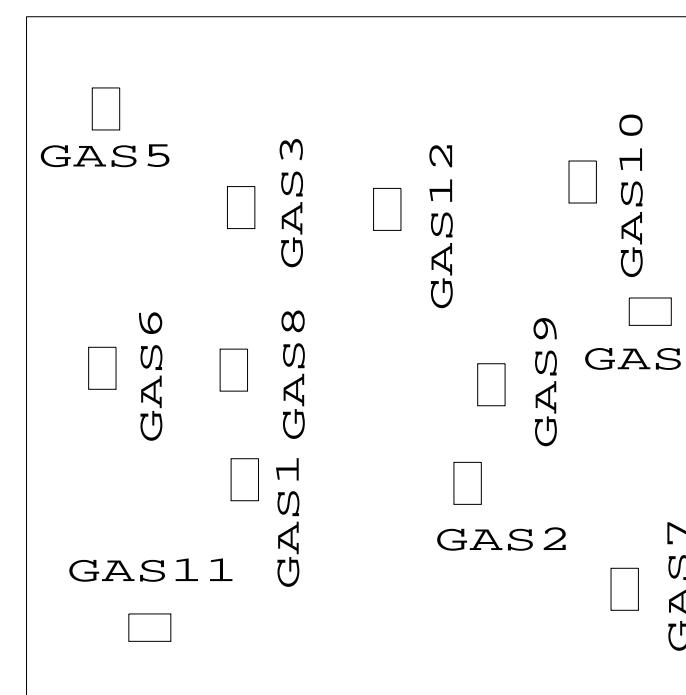
SMD GASKET FOR EMI (8 * 6 * 9.5T)



Draw bottom location when make a new pcb



EAX61538101



EAX61746401

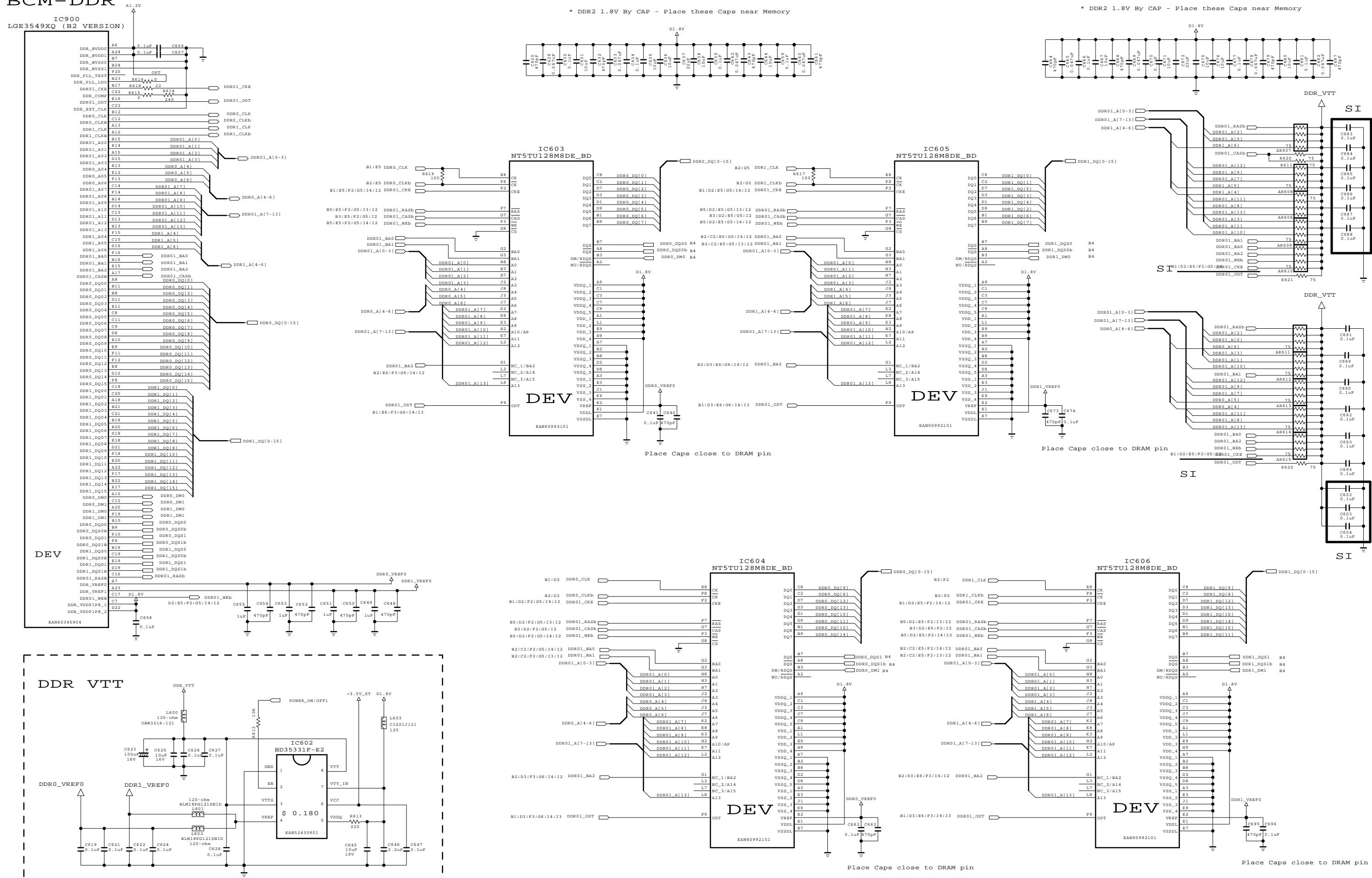
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MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	SMD_GASKET	SHEET	5 / 100

BCM – DDR



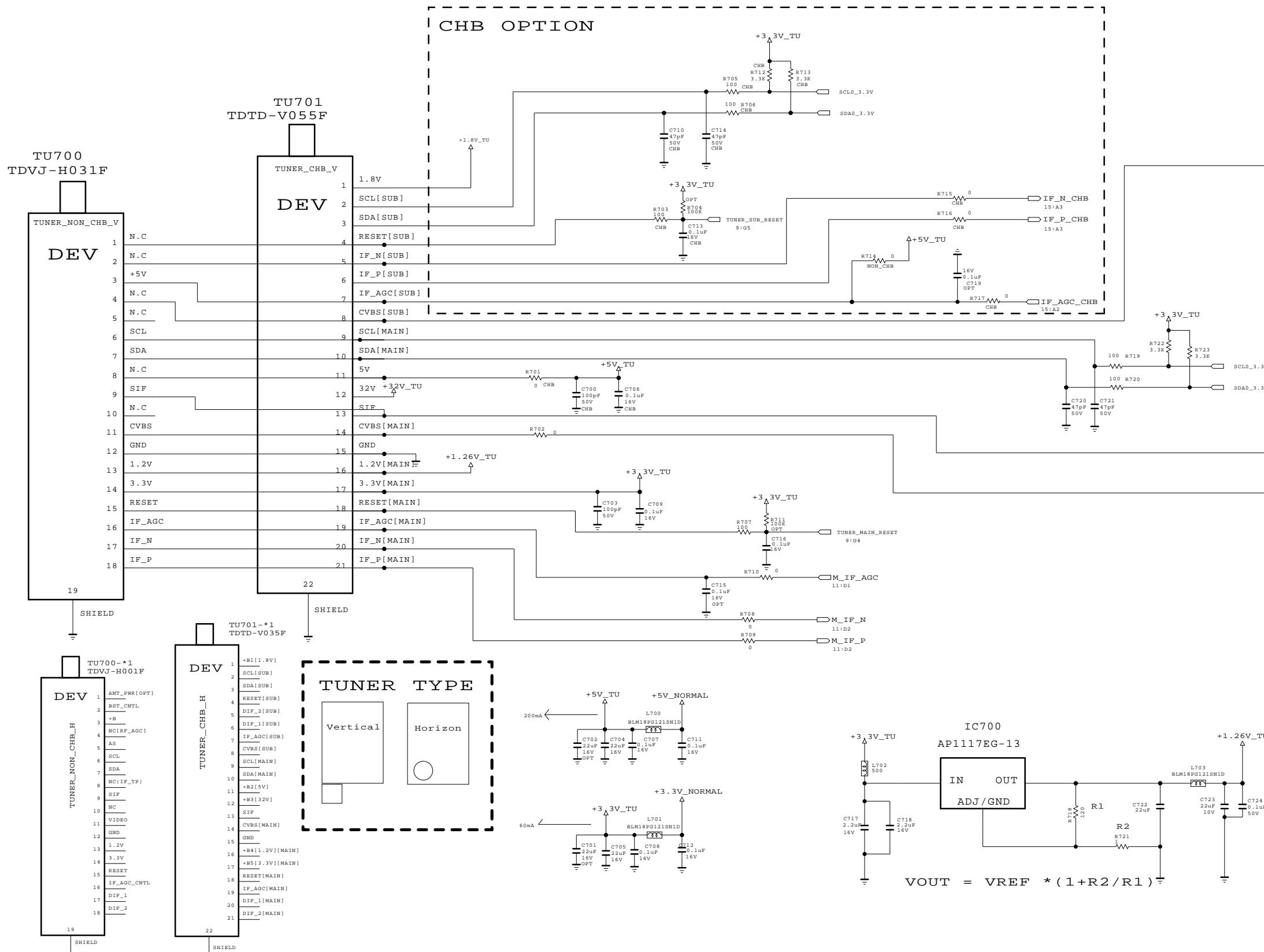
THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC

SECRET

LG ELECTRONICS

MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	BCM-DDR	SHEET	6 / 100

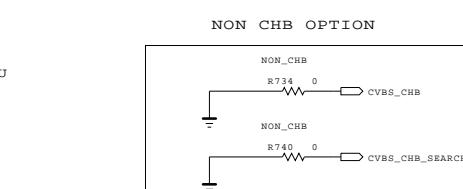
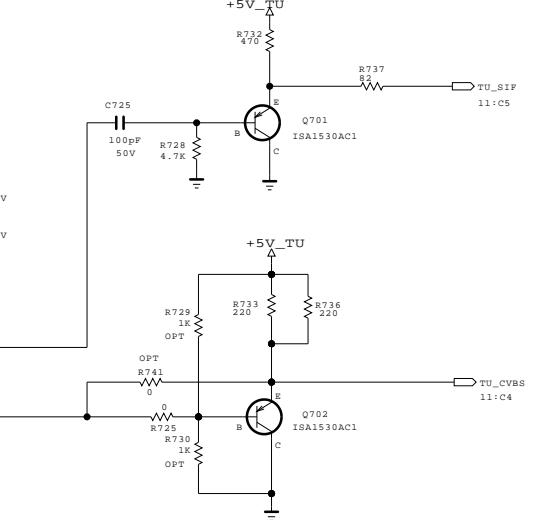
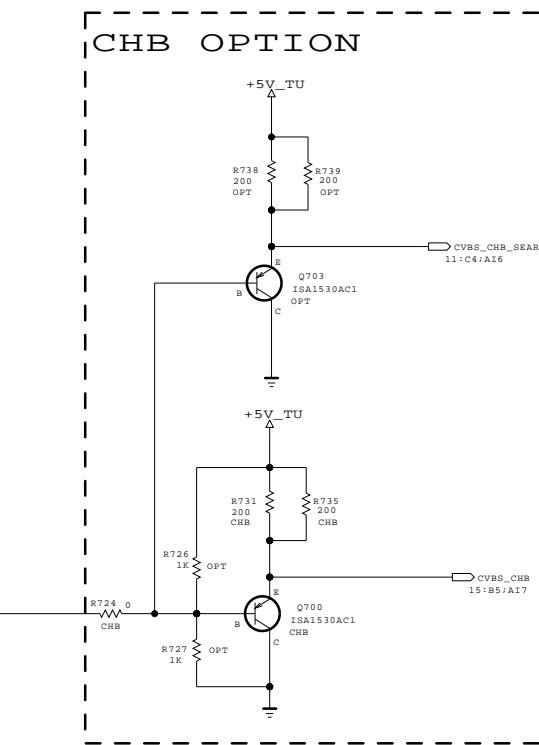
ATSC TUNER



THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. IT IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

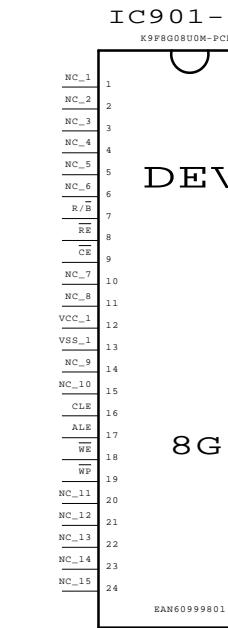
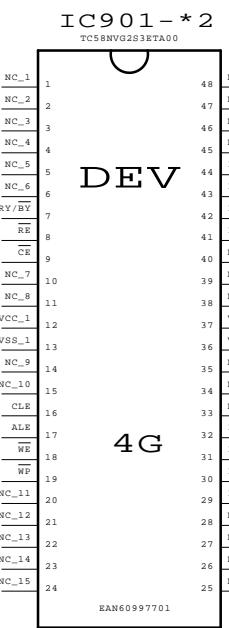
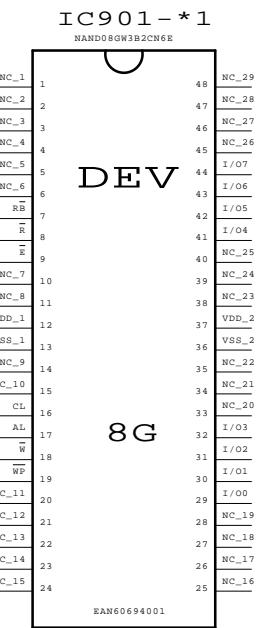
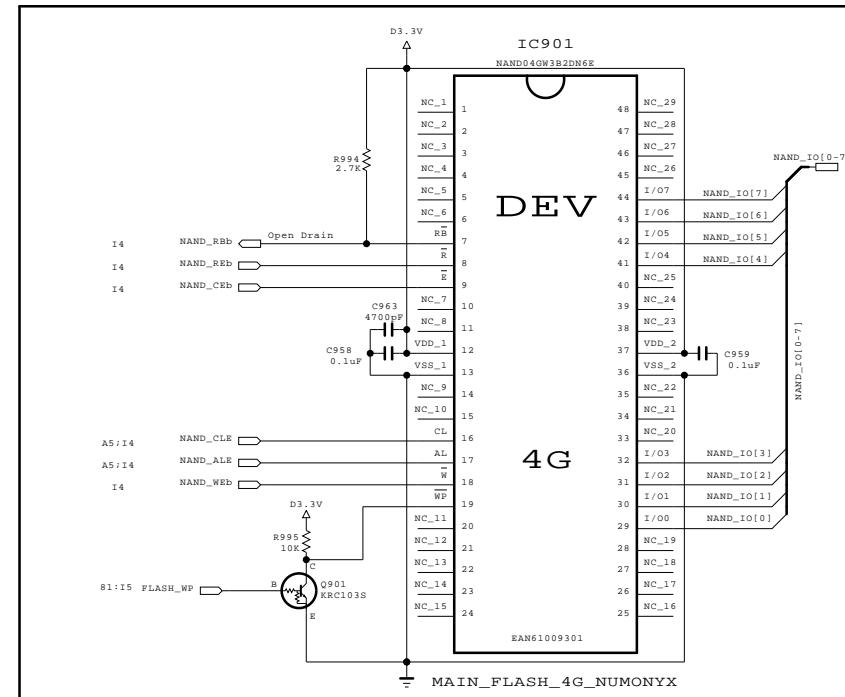
SECRET
LG Electronics

LG ELECTRONICS



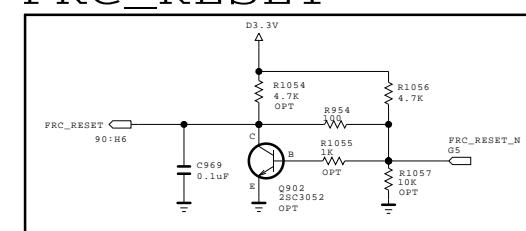
MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	ATSC_TUNER	SHEET	7 / 100

NAND FLASH MEMORY



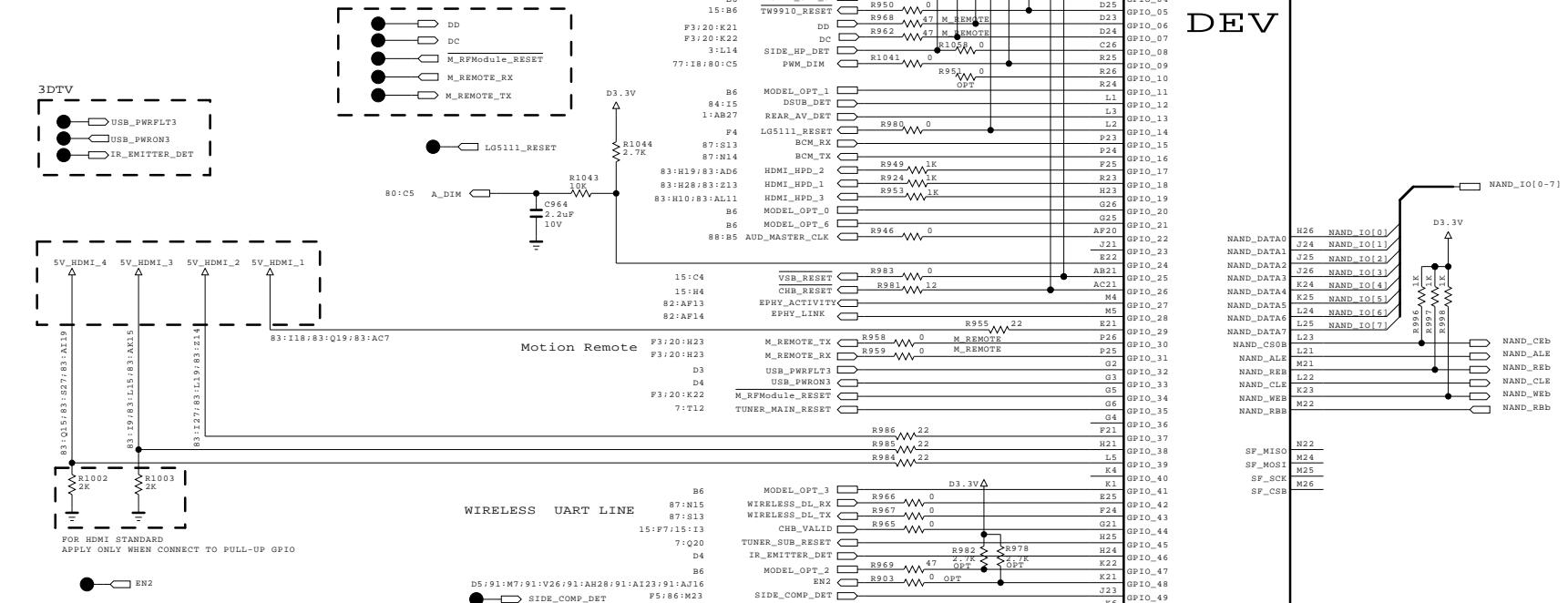
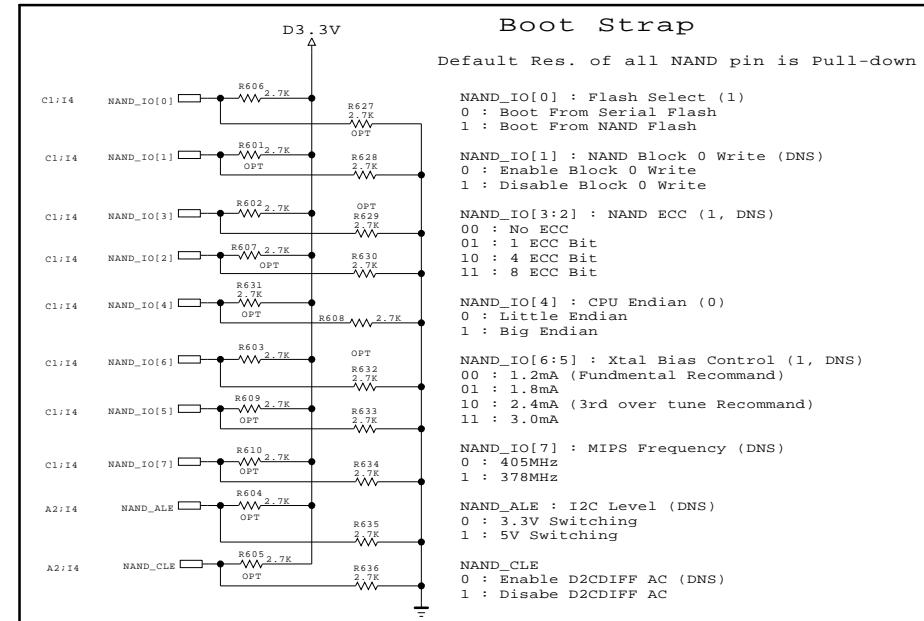
#CAUTION
Location numer is mixed
600 & 900 & 1000

NVRAM

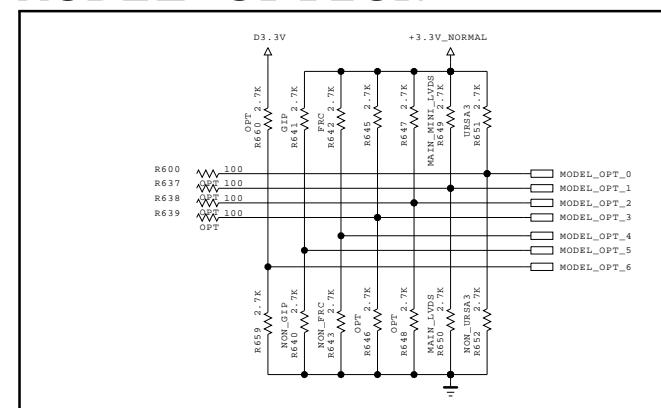


BCM3549 GIPO

BCM3549 Boot Strap



MODEL OPTION

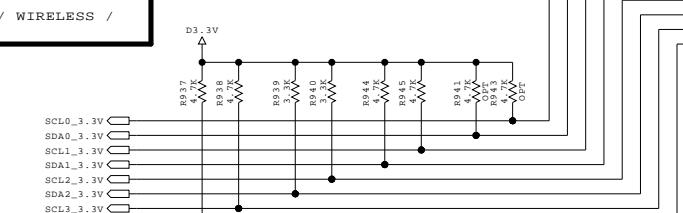
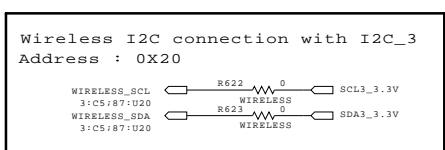


PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	G26	URSA3	NON_URSA3
MODEL_OPT_1	R24	MAIN_MINI_LVDS	MAIN_LVDS
MODEL_OPT_2	K22	DDR-512M	DDR-256M
MODEL_OPT_3	K1	FHD	HD
MODEL_OPT_4	E23	FRC	NON_FRC
MODEL_OPT_5	D26	G1P	NON-G1P
MODEL_OPT_6	G25	OLED	NON_OLED

*MODEL_OPT_0 & MODEL_OPT_4 REFER TO THIS OPTION		
MODEL_OPT_0	MODEL_OPT_4	
LOW	LOW	NO FRC
HIGH	LOW	URSA3 Internal
HIGH	HIGH	URSA3 External
LOW	HIGH	PWIZ Pannel T- with LG FRC

I2C MAP

```
* I2C_0: AT TUNER(C2,10) / CHB TUNER
* I2C_1: MICOM(52) / NTP7000(54) / URSA3(B4)
* I2C_2: HDMI SW(C0) / VIDEO ENC. / VSB DEMOD.CH BLOWSER,
          SUB AMP
* I2C_3: NVRAM(A8) / LG5111(1E) / P-GAMMA(E8) / WIRELESS /
```



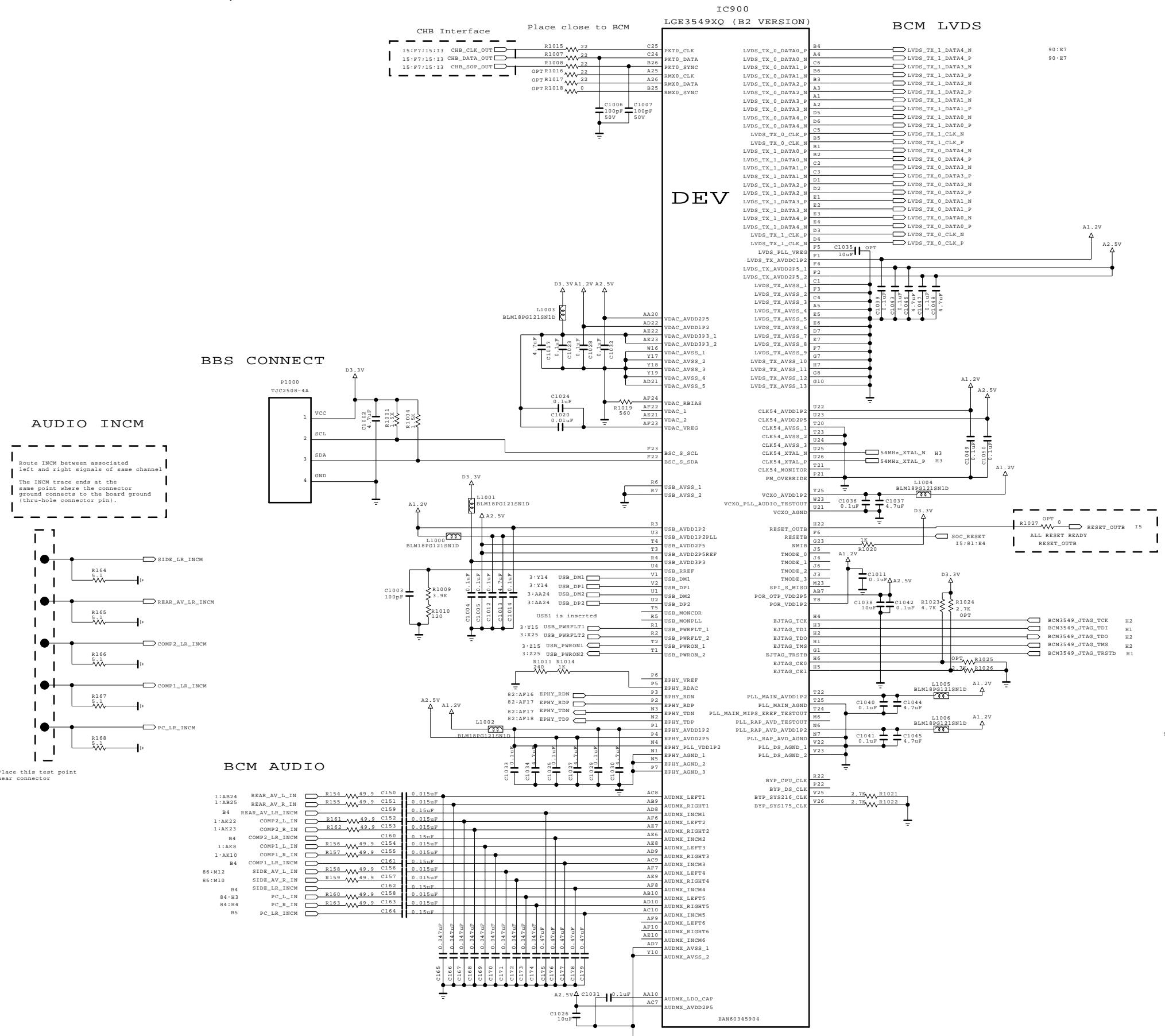
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SECRET
LG Electronics

LG ELECTRONICS

MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	BCM-BOOT / FLASH / GPIO	SHEET	9 / 100

BCM3549 LVDS/AUDIO



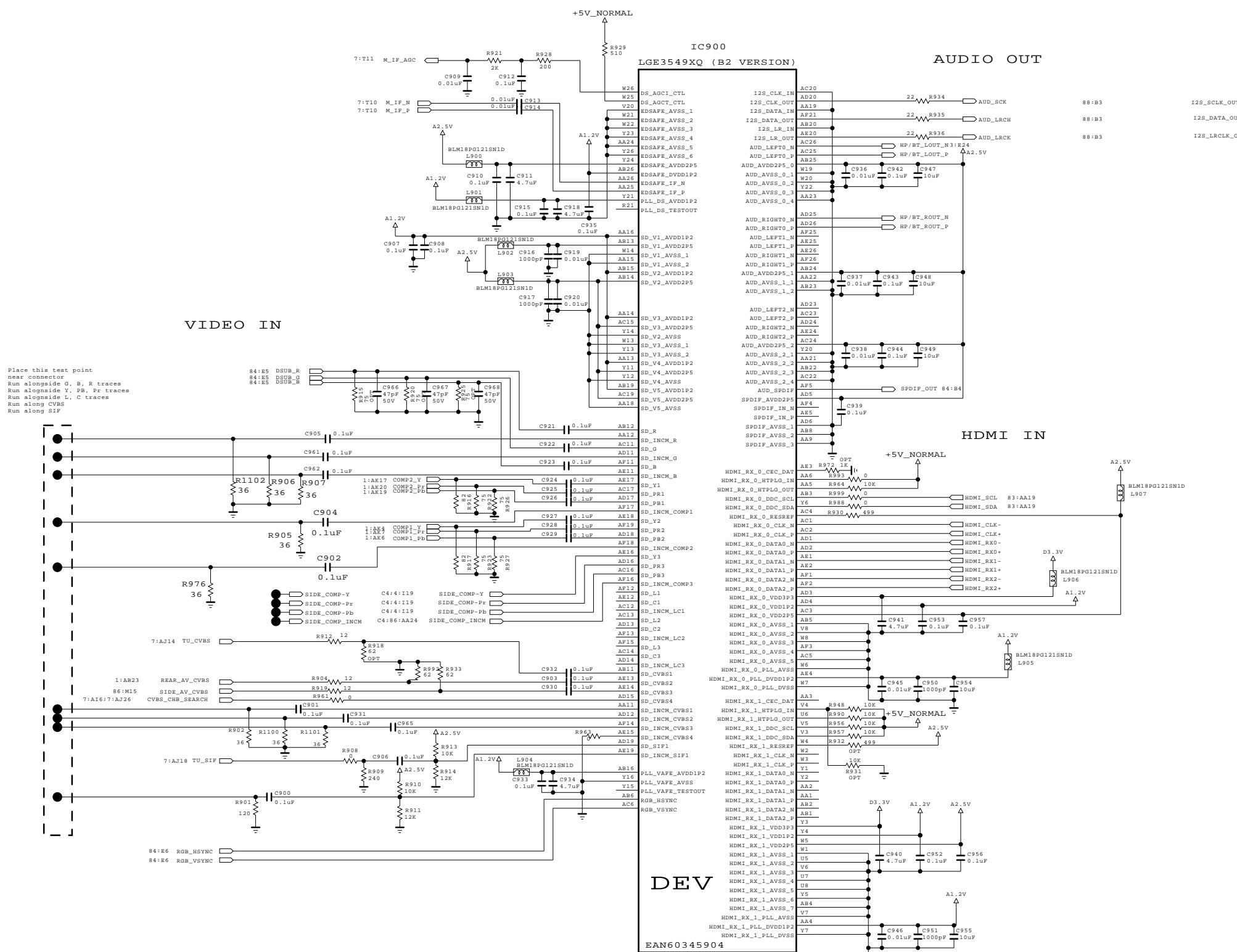
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SECRET
LG Electronics

LG ELECTRONICS

#CAUTION
Location numer is mixed
100 & 1000



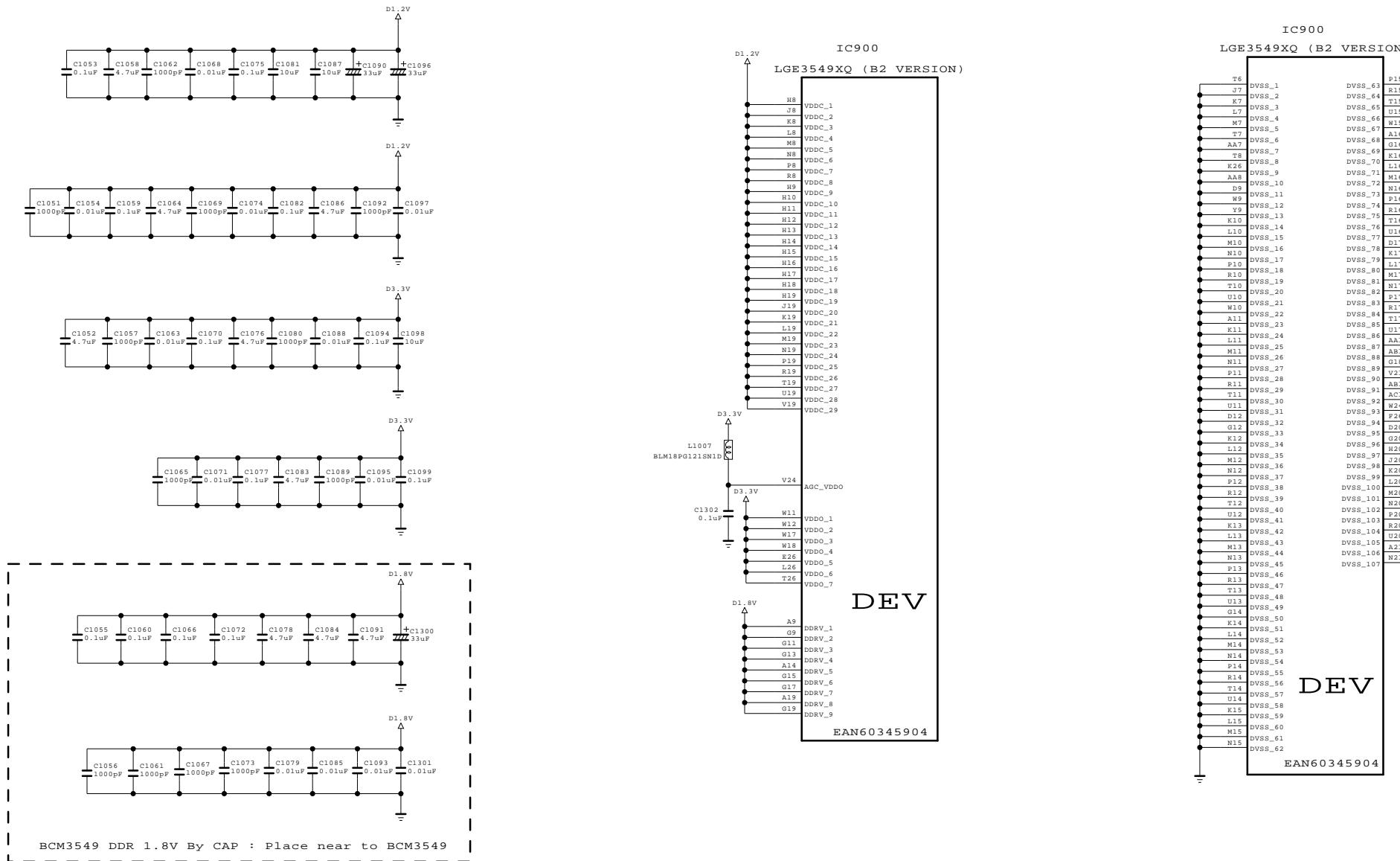


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SECRET
LG Electronics

LG ELECTRONICS

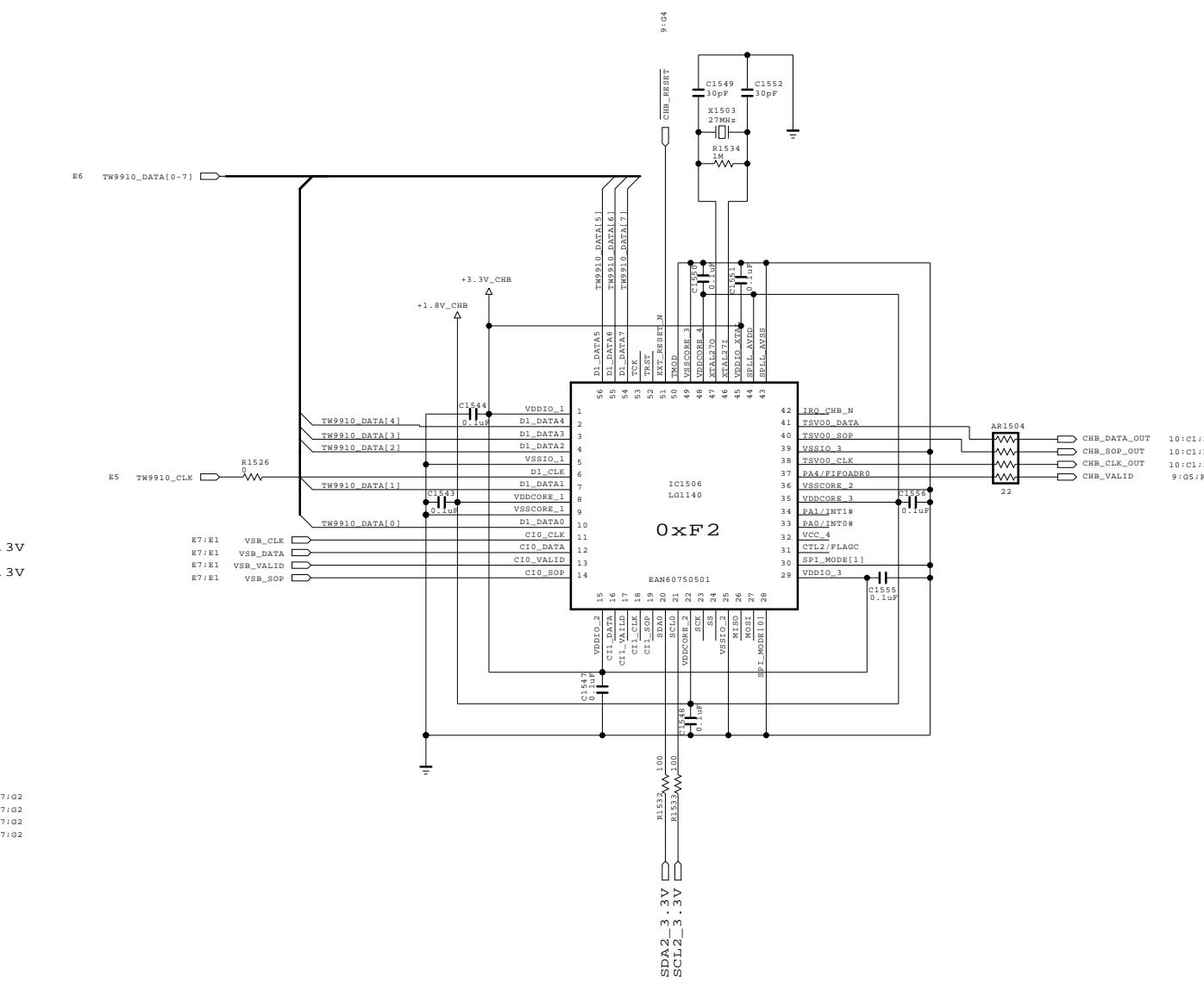
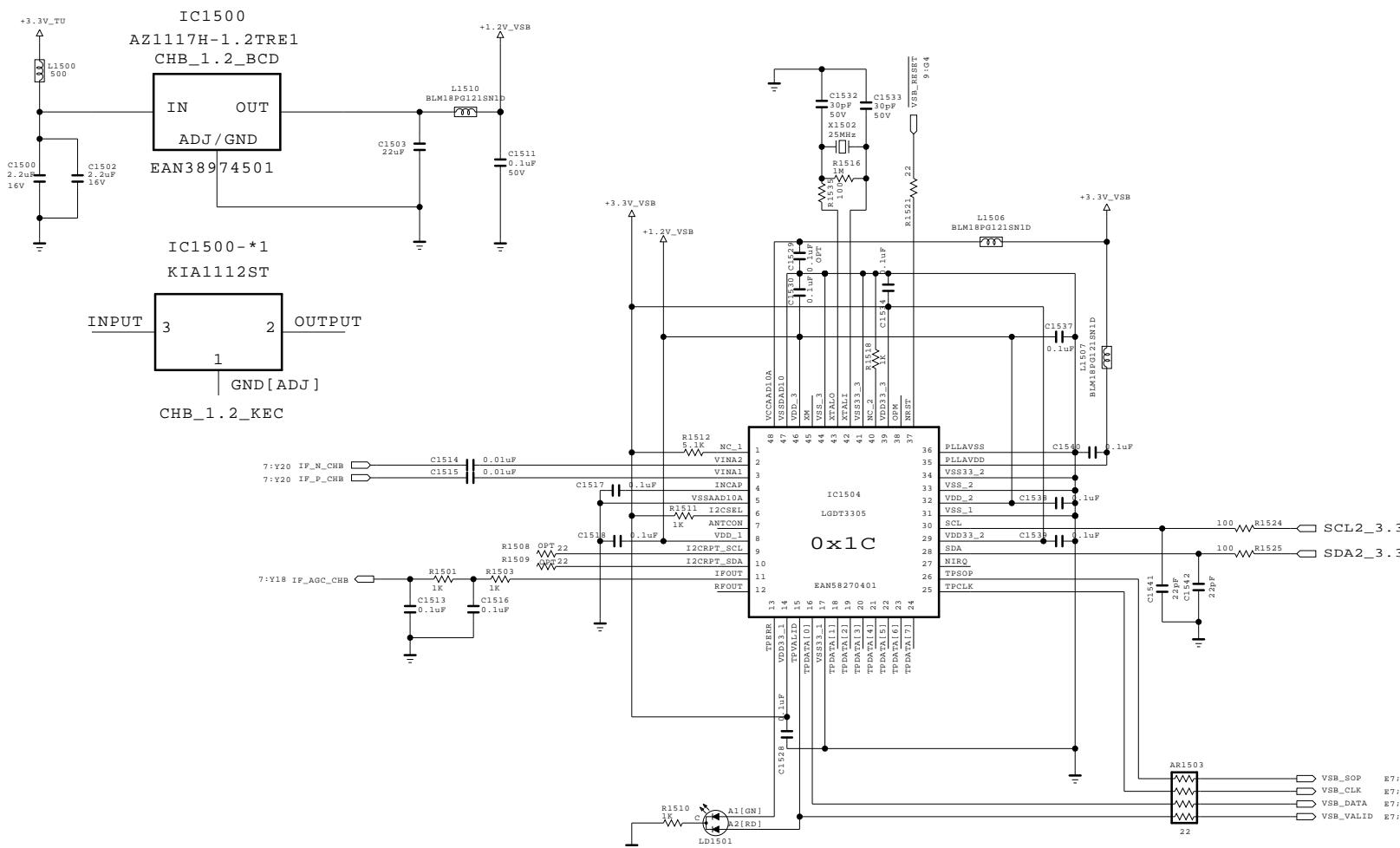
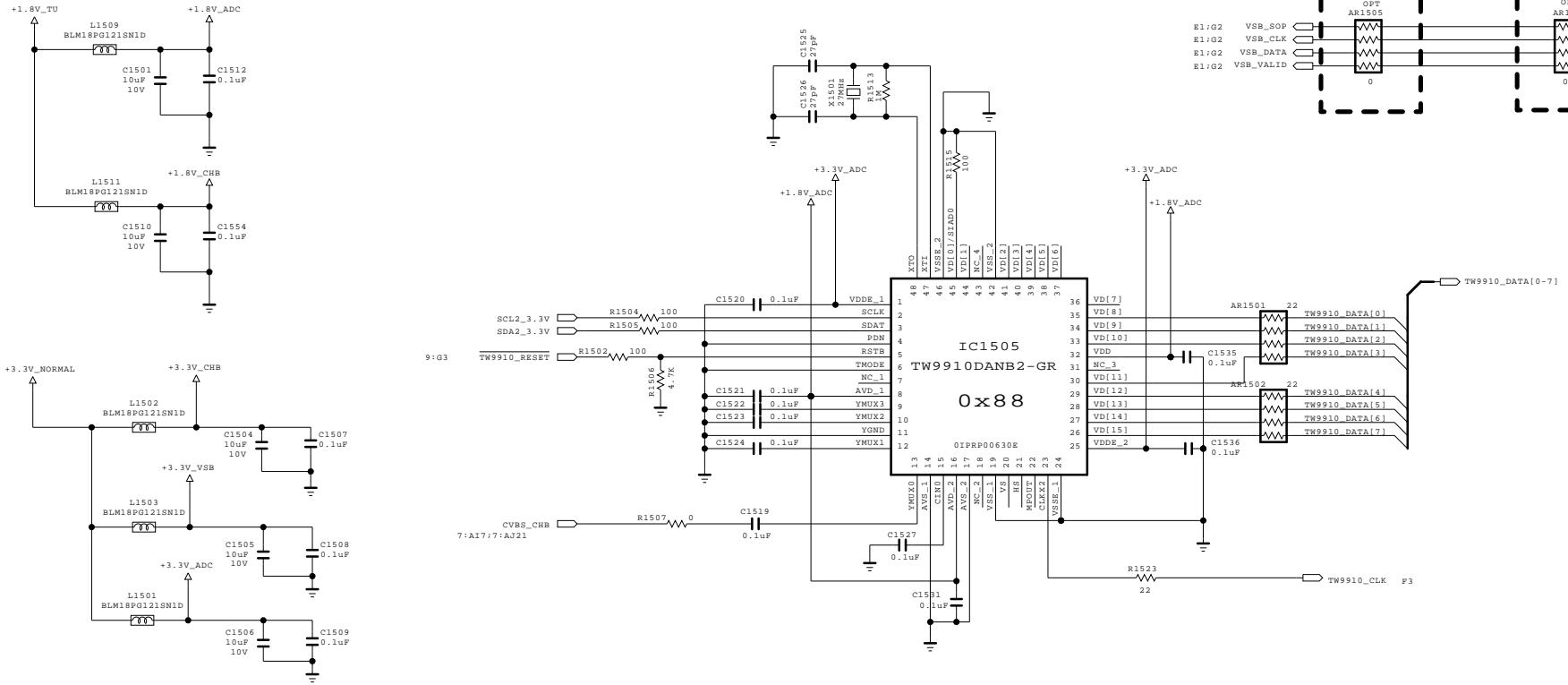
<u>MODEL</u>	GP2_BCM_ATSC	<u>DATE</u>	09/10/xx
<u>BLOCK</u>	BCM-VIDEO	<u>SHEET</u>	11 / 100



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Channel Browser

#ALL CHB OPTION#



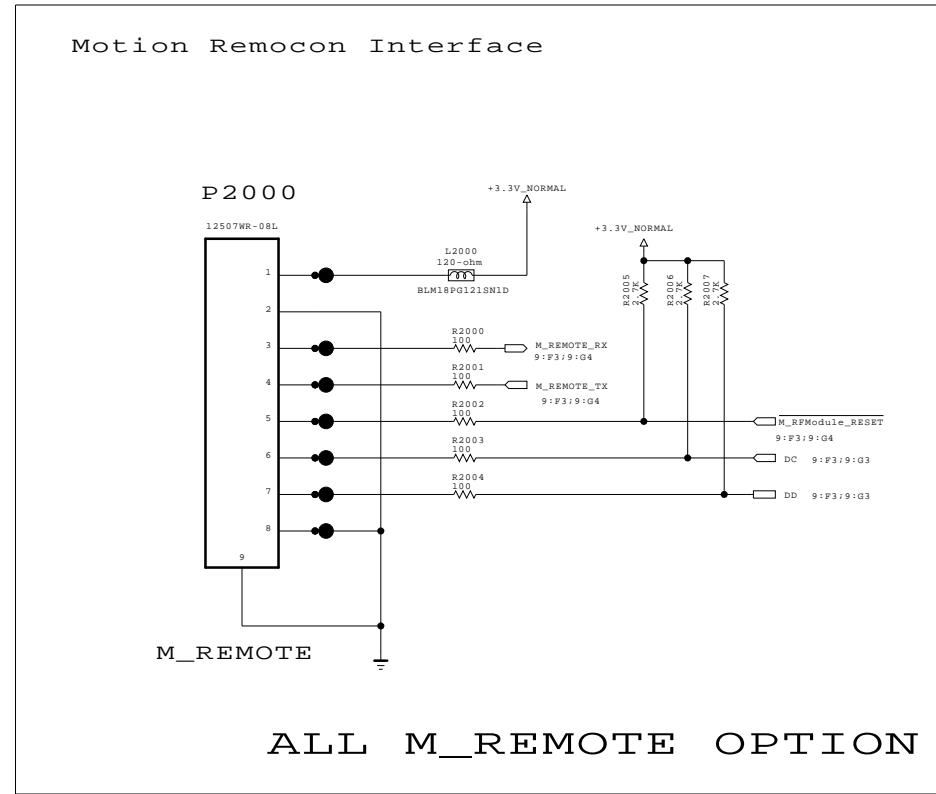
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MODEL	GP2_BCM_ATSC	DATE	09.10
BLOCK	CHB	SHEET	15 / 100

Motion Remote controller



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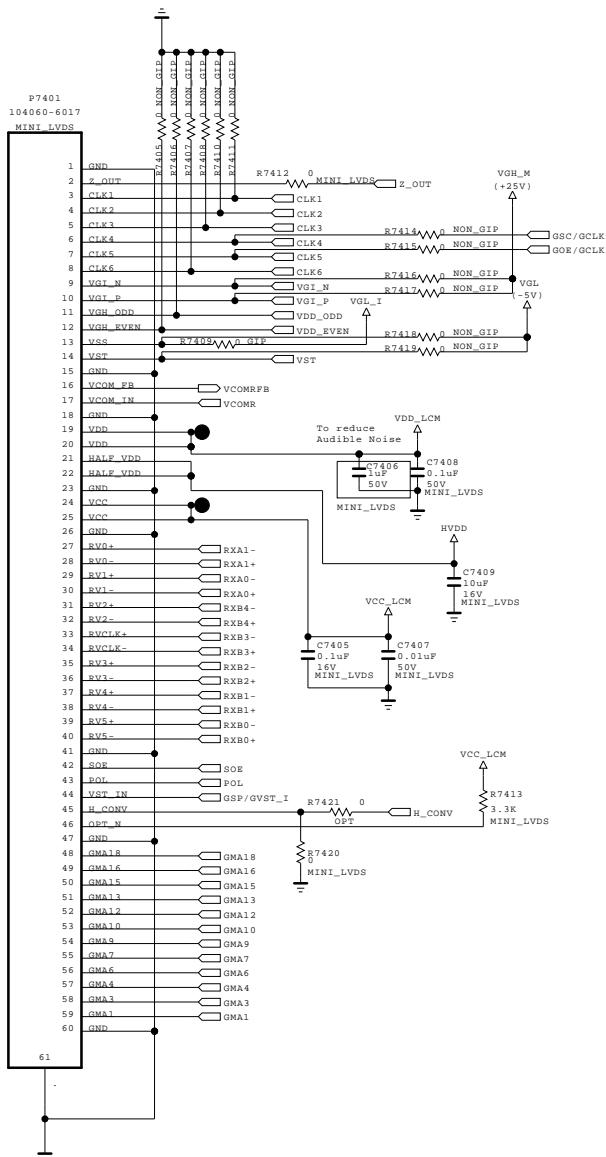
SECRET
LG Electronics

LG ELECTRONICS

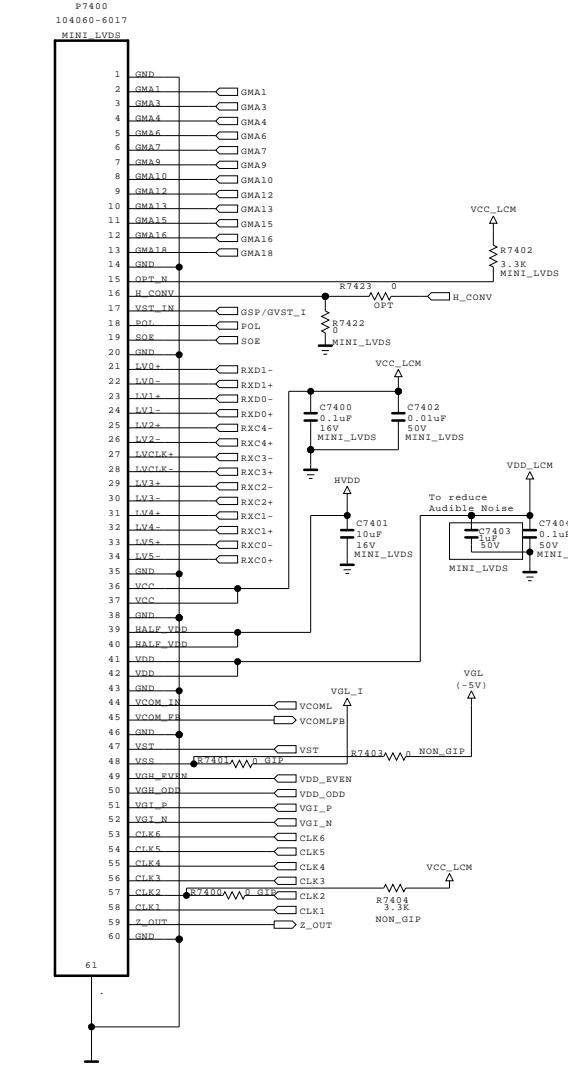
MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	MOTION_REMOTE	SHEET	20 / 100

MINI-LVDS FROM URSA3

[LEFT FFC Connector to Module RIGHT Conn]
(60Pin Mini-LVDS)



[RIFHT FFC Connector to Module LEFT Conn]
[(60Pin Mini-LVDS)]



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SECRET

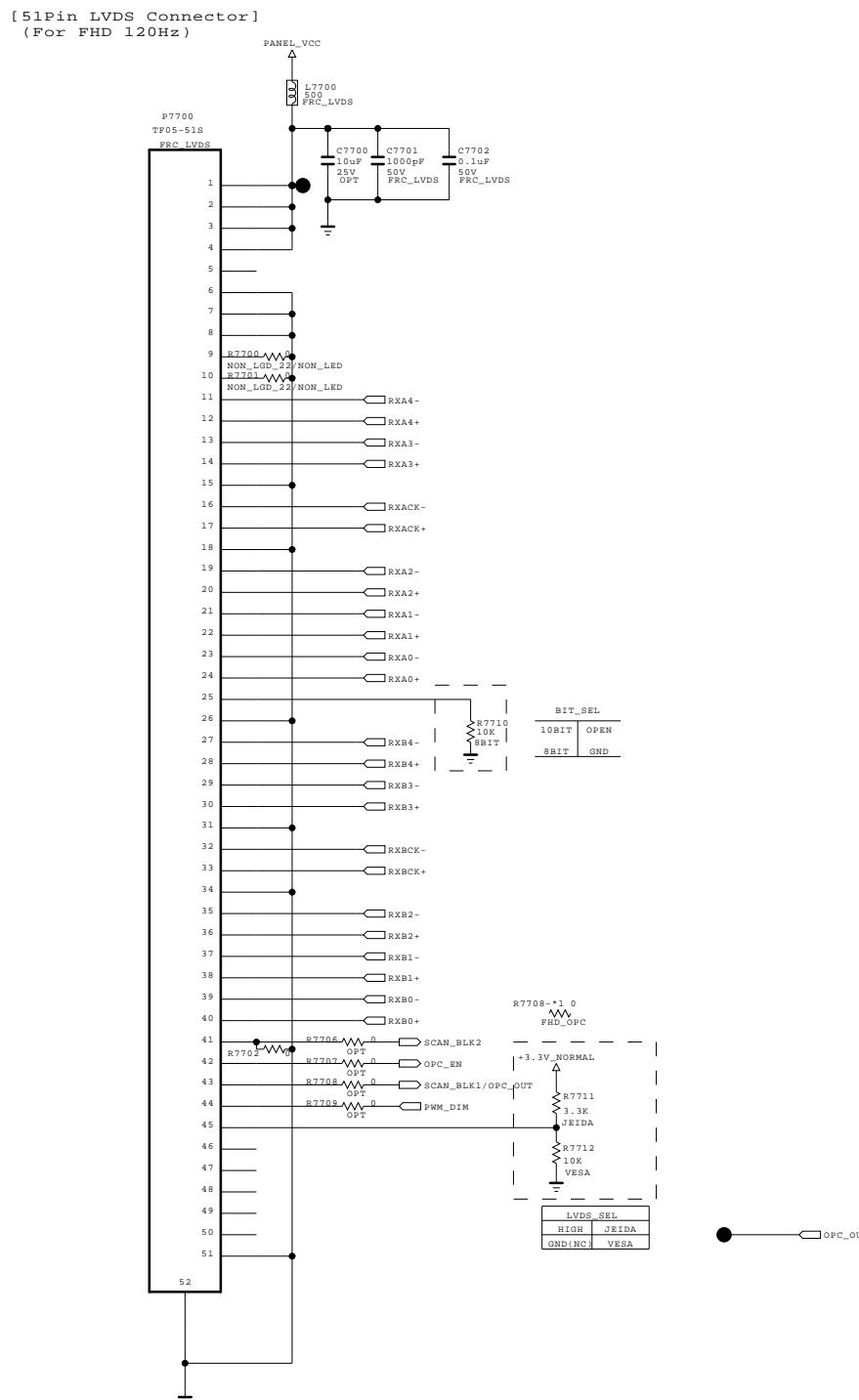


-2) LG ELETTRONICA

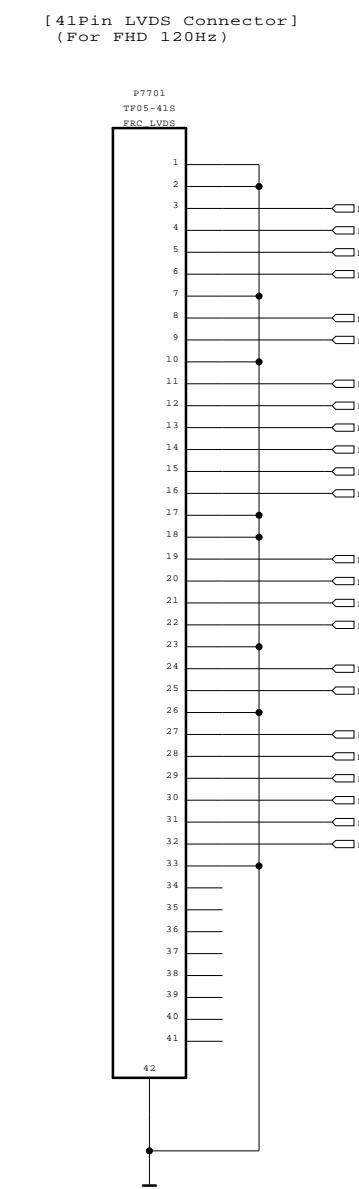
MODEL	COMMON	DATE	09/10/xx
BLOCK	URSA3 120Hz MINI_LVDS	SHEET	74

LVDS FROM URSA3

[LEFT FFC Connector to Module LEFT Conn]
(51Pin LVDS)



[RIFHT FFC Connector to Module RIGHT Conn]
(41Pin LVDS)



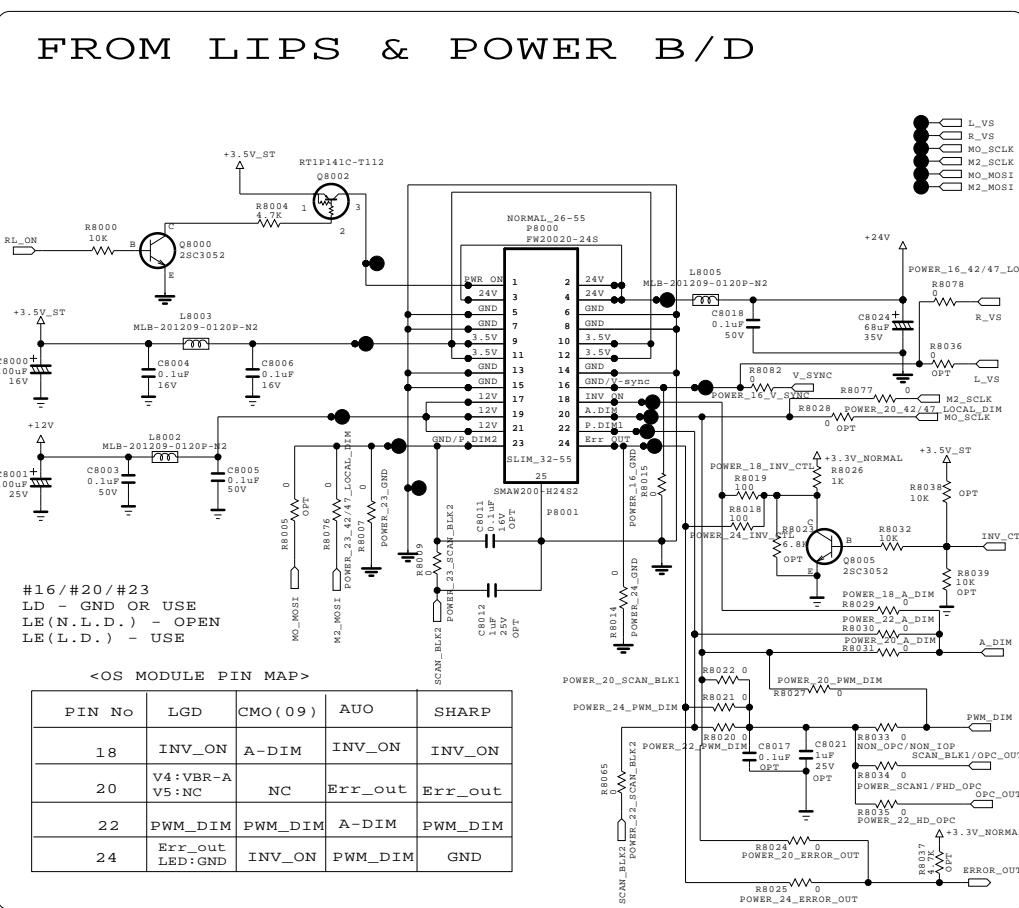
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SECRET
LG Electronics

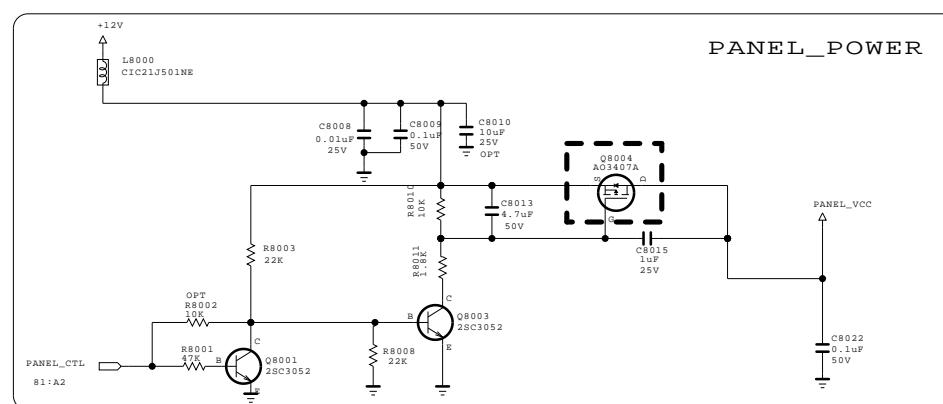
LG ELECTRONICS

MODEL	COMMON	DATE	09/10/xx
BLOCK	URSA3 120Hz LVDS	SHEET	77 / 100

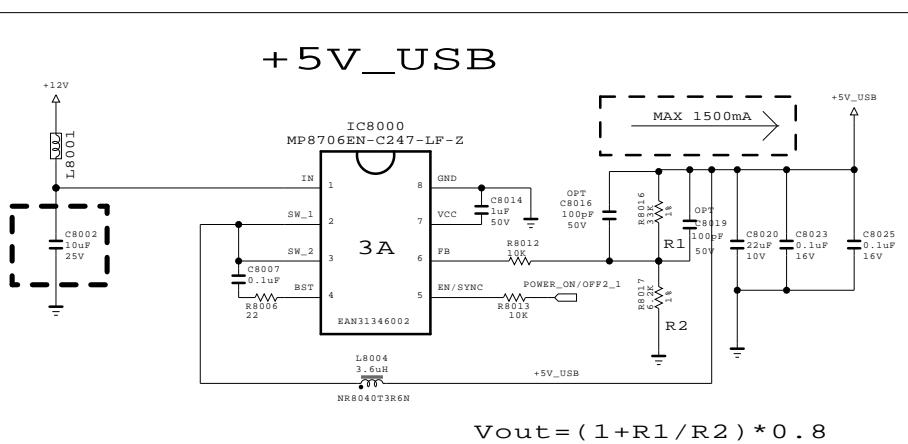
FROM LIPS & POWER B/D



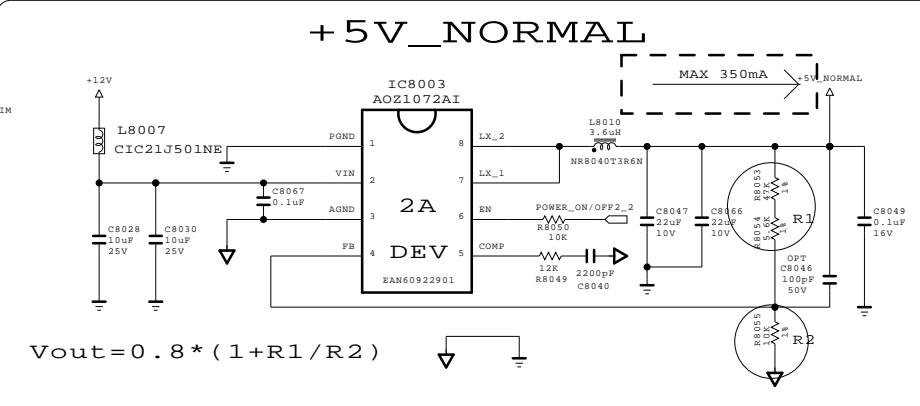
CHECK PWR/MODULE PIN MAP



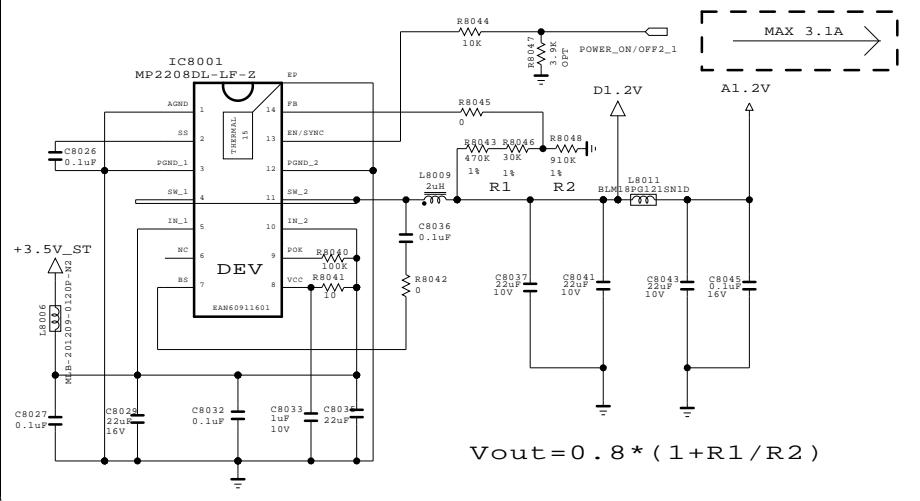
+5V USB



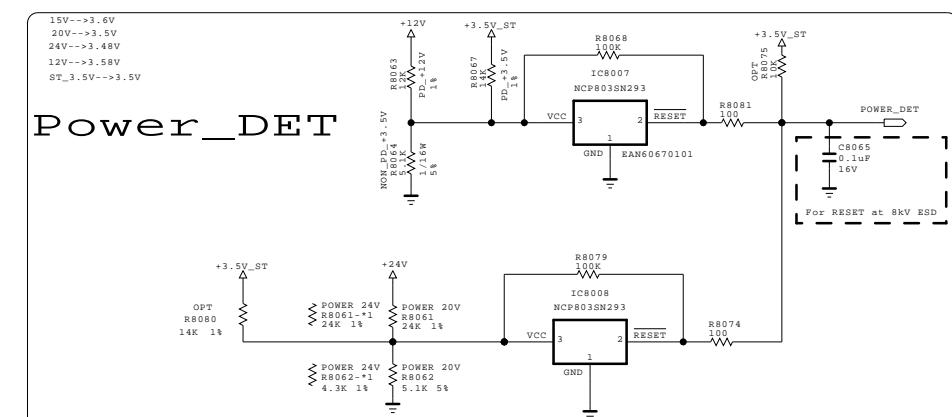
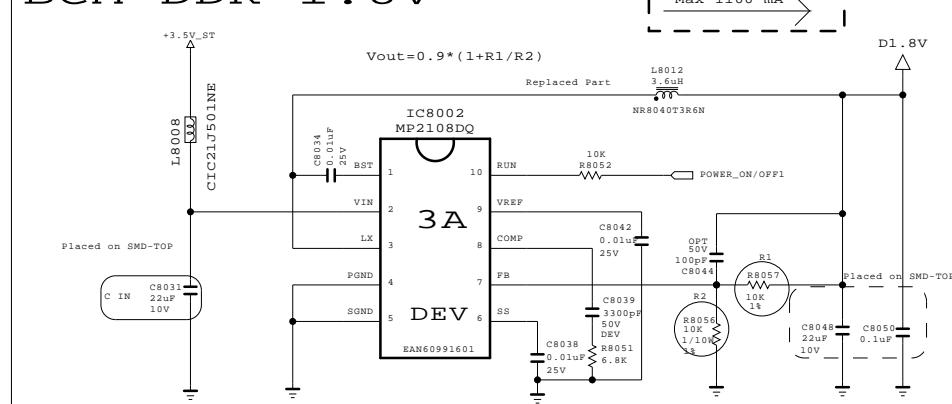
$$V_{out} = (1 + R1/R2) * 0.8$$



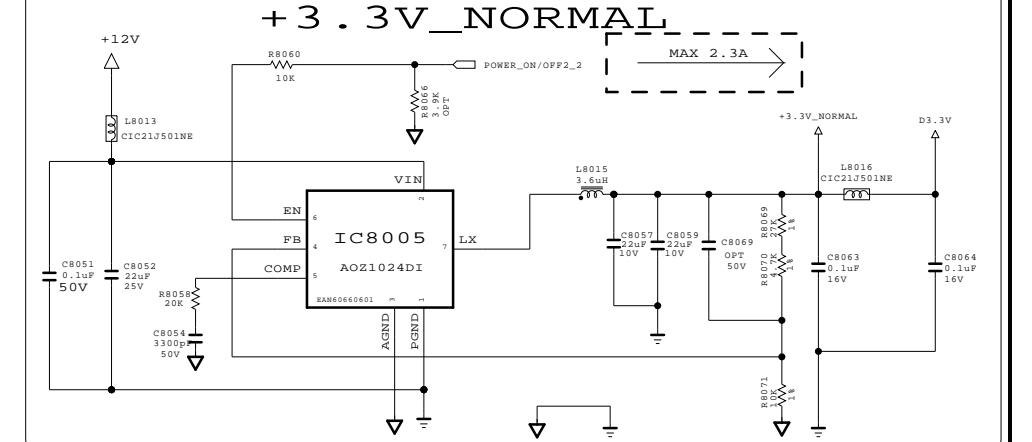
BCM core 1.2V volt



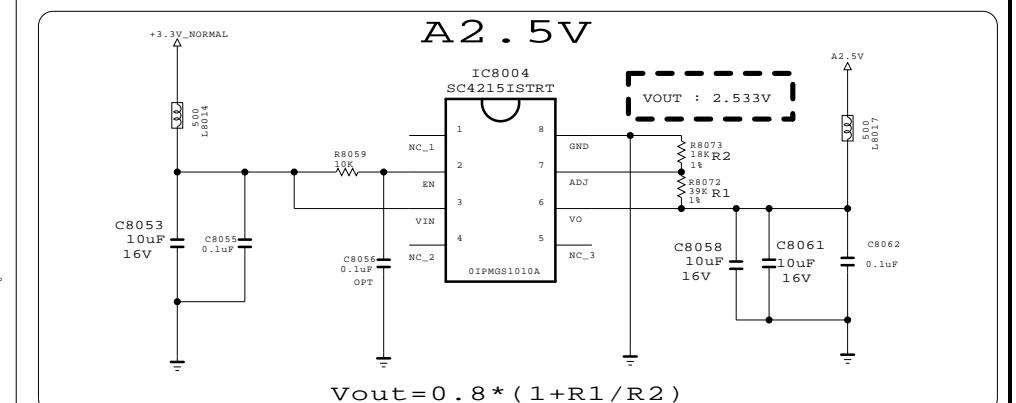
BCM DDR 1.8V



+3.3V_NORMAL



A2.5V

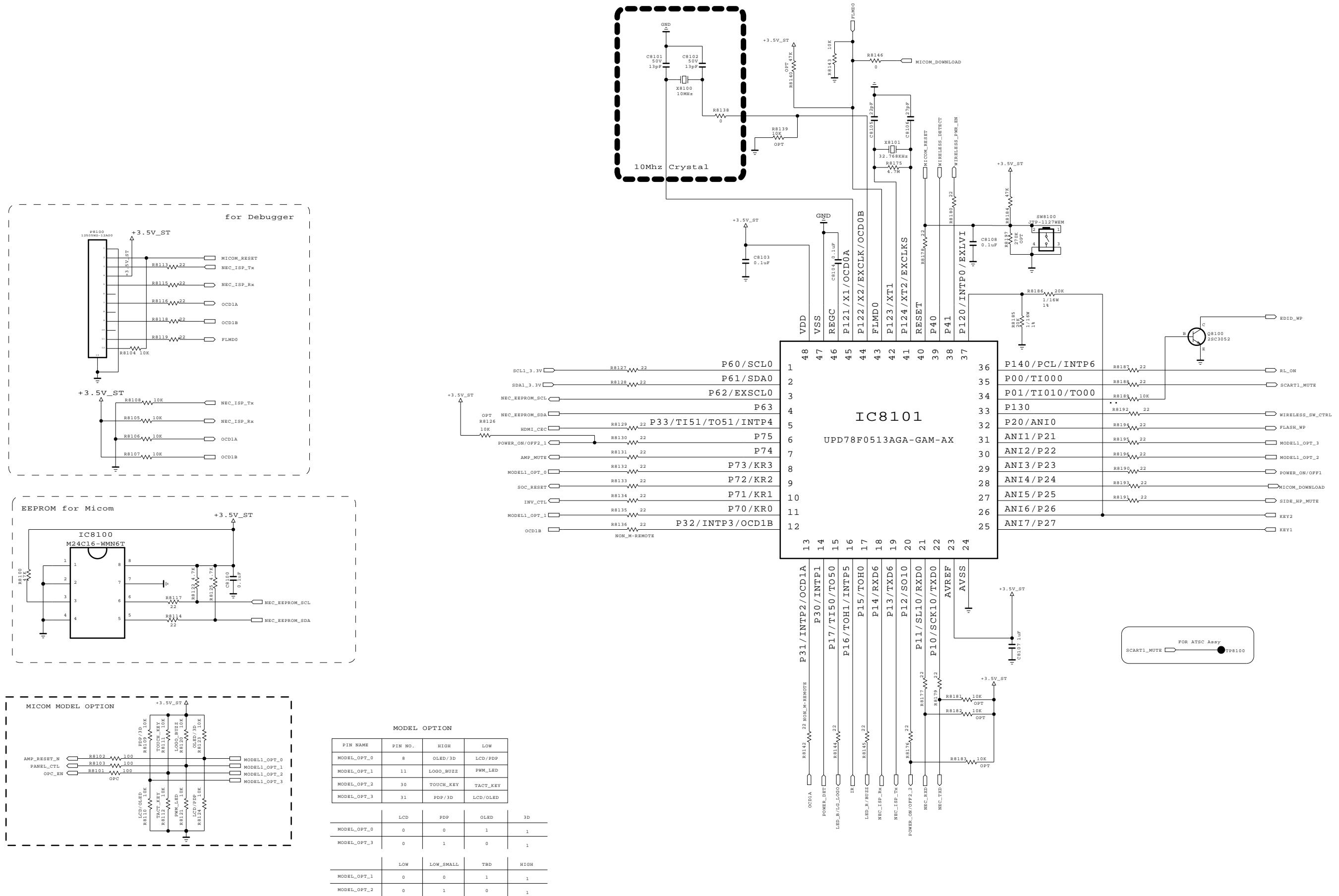


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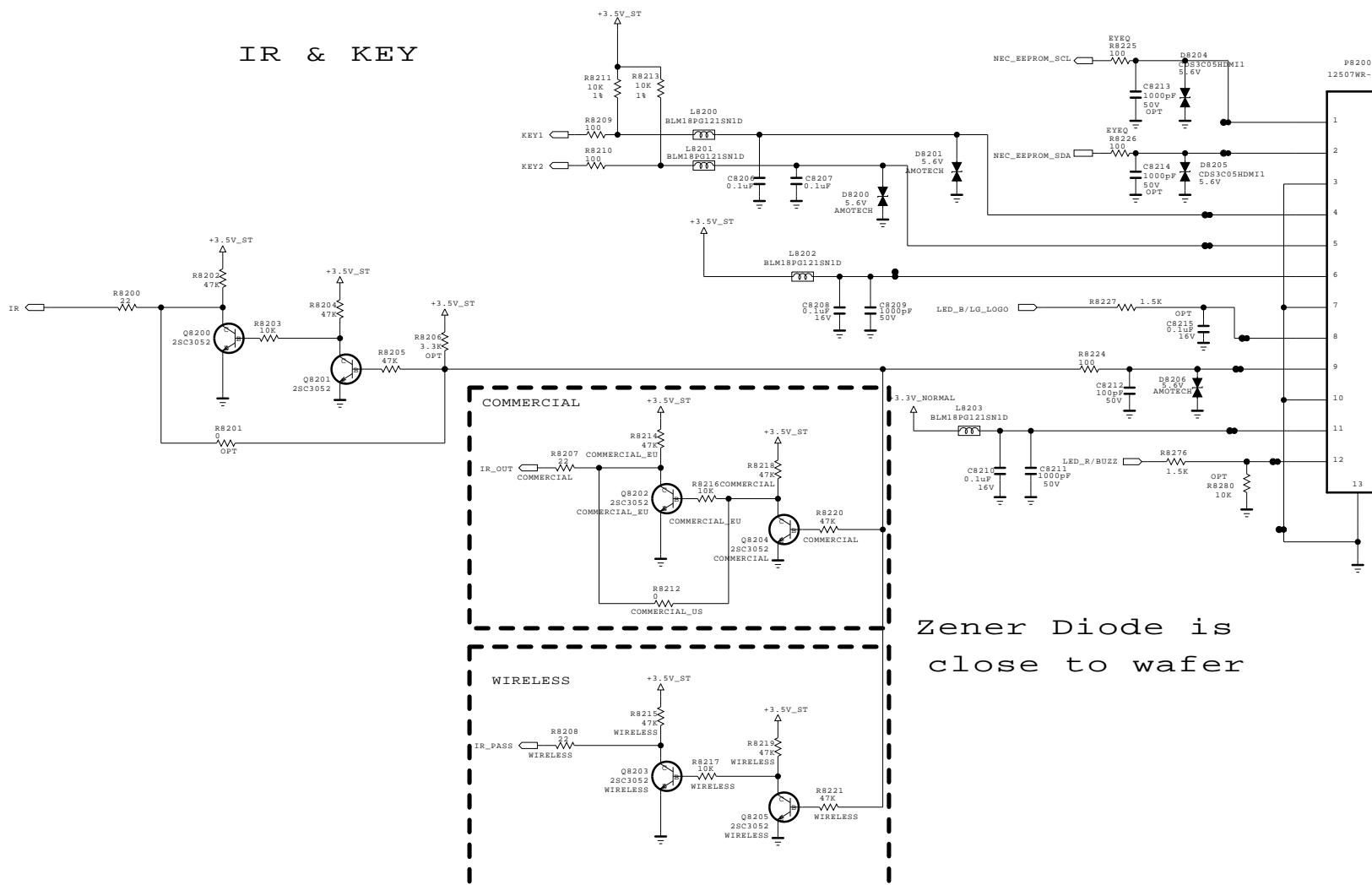
SECRET
LG Electronics

LG ELECTRONICS

MODEL	COMMON	DATE	09/10/xx
BLOCK	POWER	SHEET	80 / 100

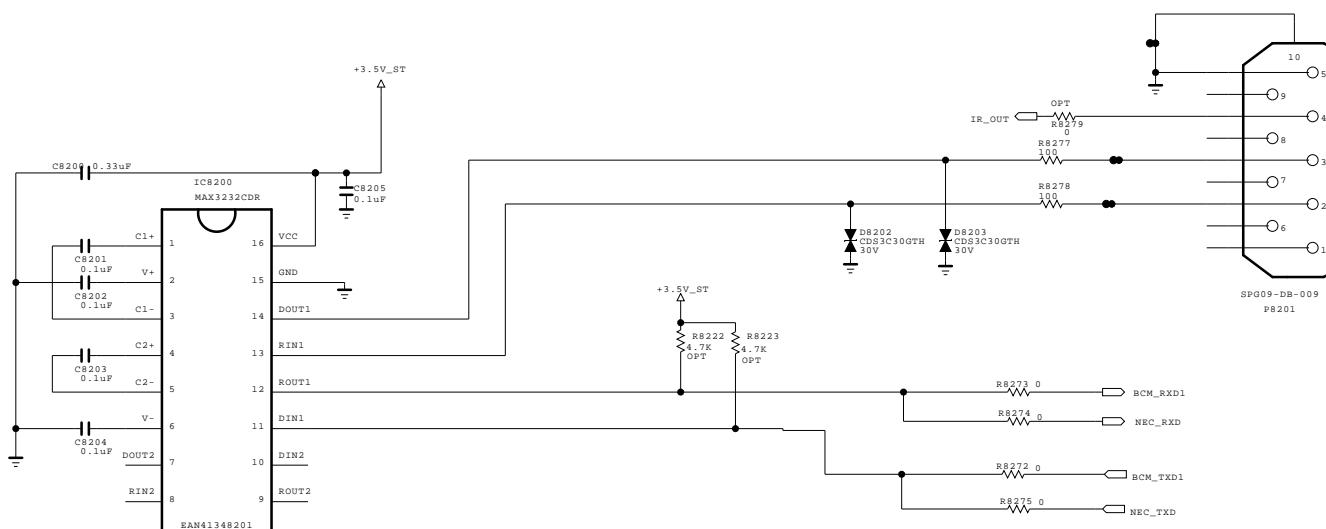


IR & KEY



Zener Diode is
close to wafer

RS232C



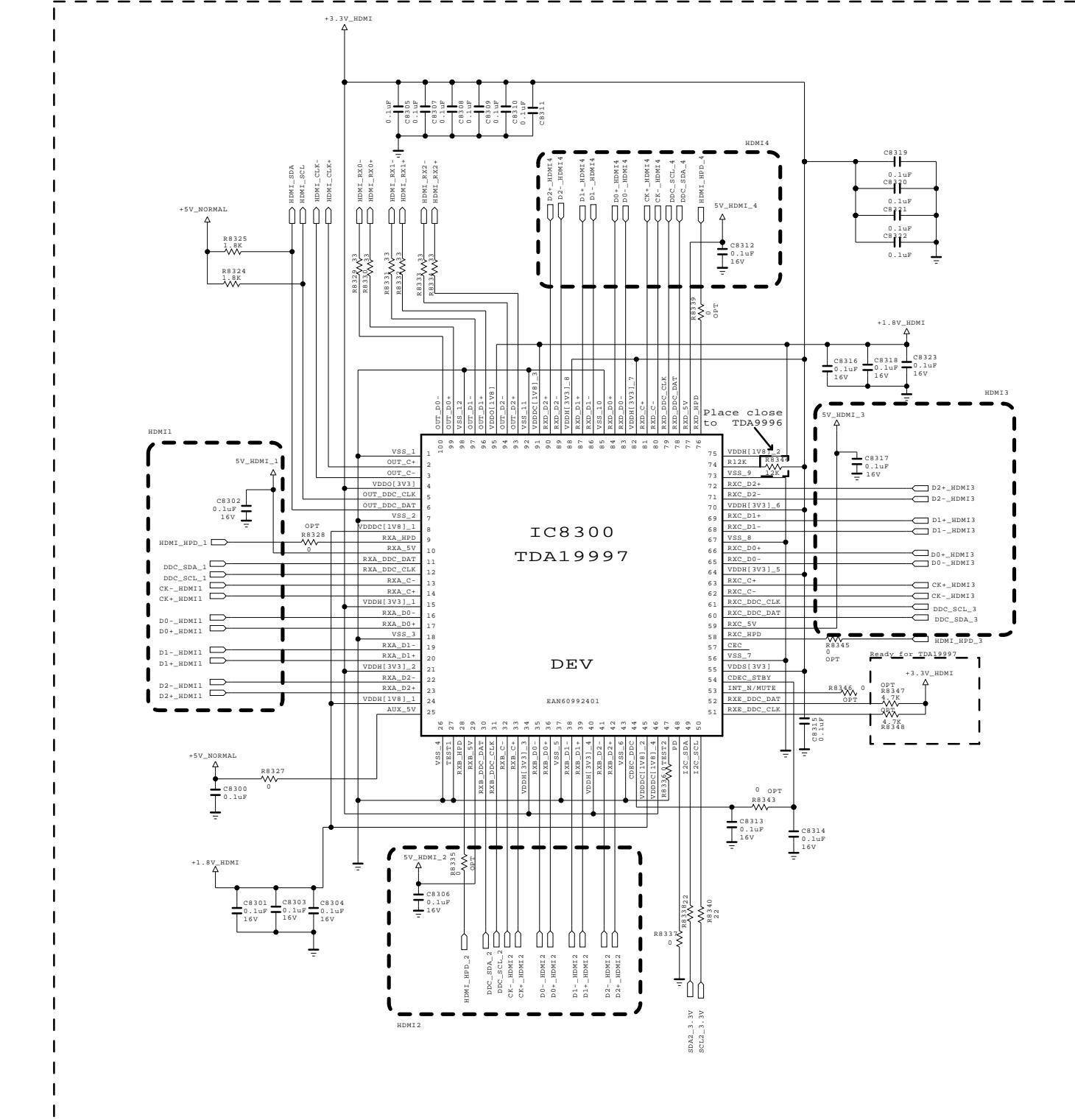
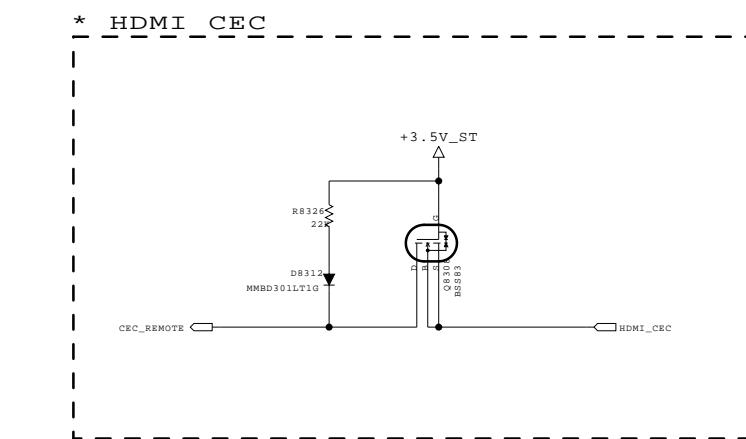
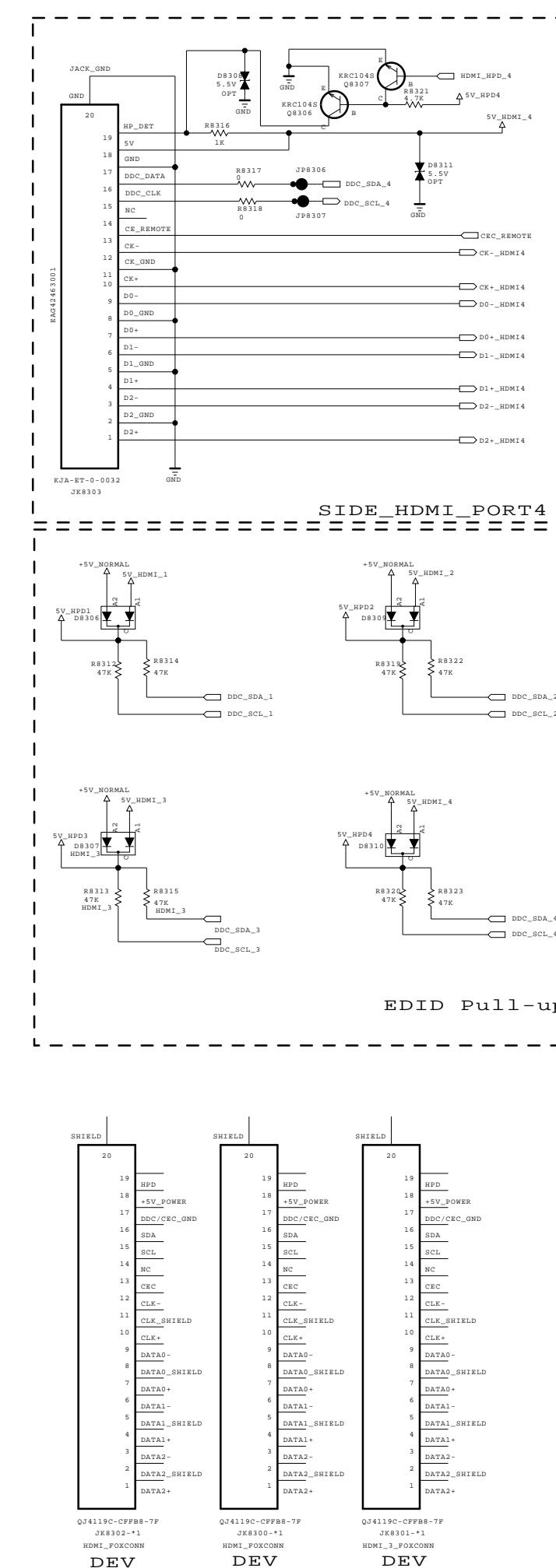
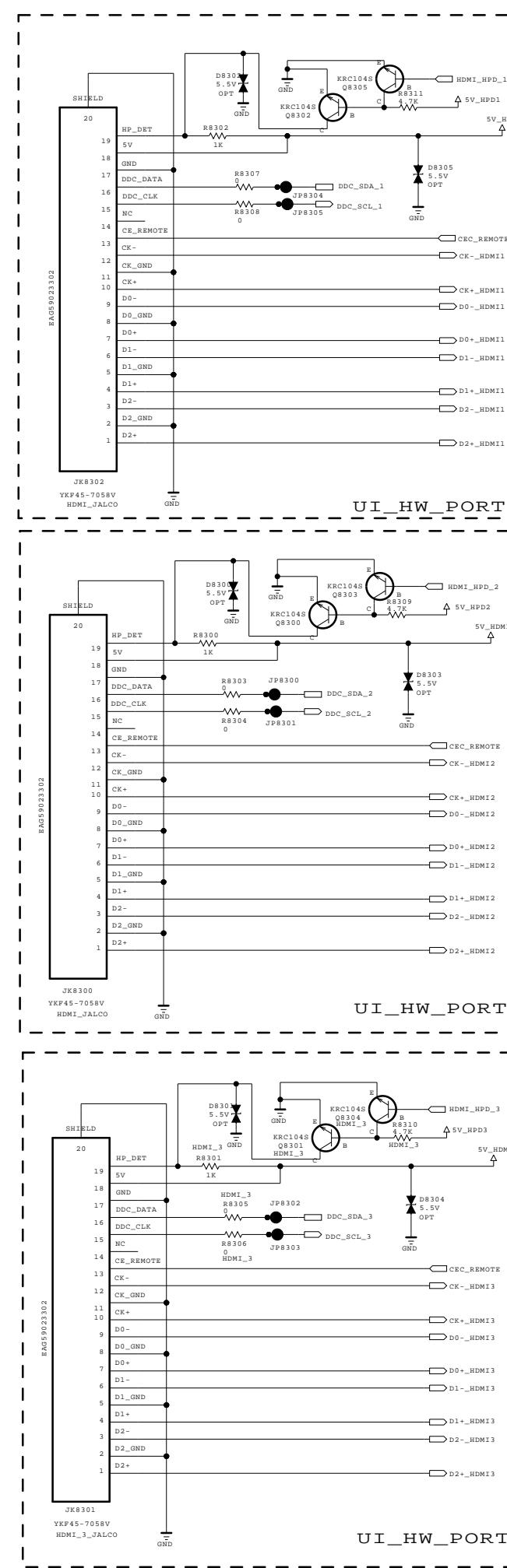
Trace impedance : 100 ohm differential impedance to GND plane
5 mils trace width with 7 mils air gap on P/N pair.
Adjacent TX/RX differential pairs should be separated by more than
15 mils to each other

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SECRET
LG Electronics

LG ELECTRONICS

MODEL		DATE	
BLOCK		SHEET	/

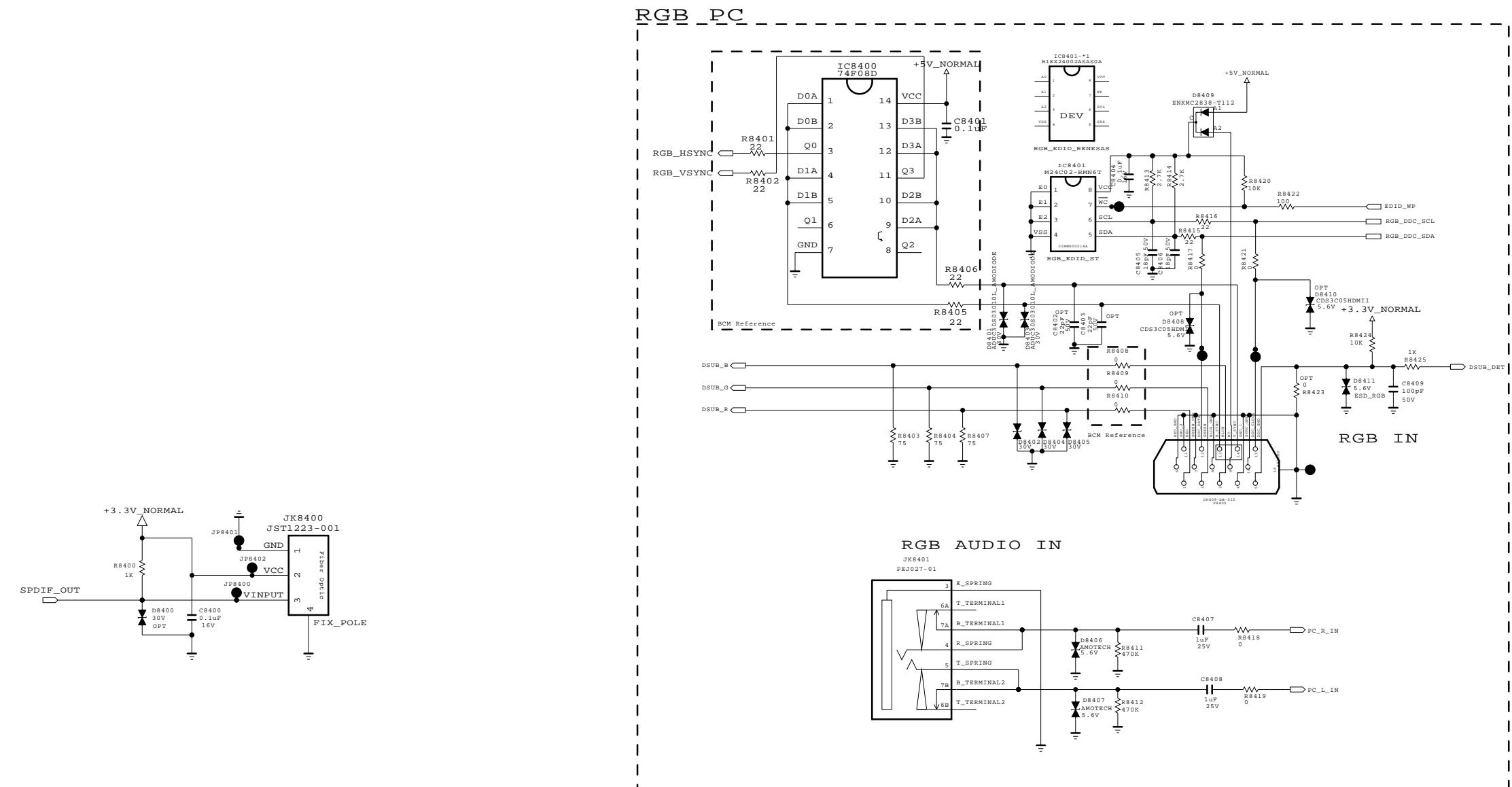


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SECRI
LG Electro

LG ELECTRONICS

MODEL	COMMON	DATE	09/10/xx
BLOCK	HDMI	SHEET	83 / 100



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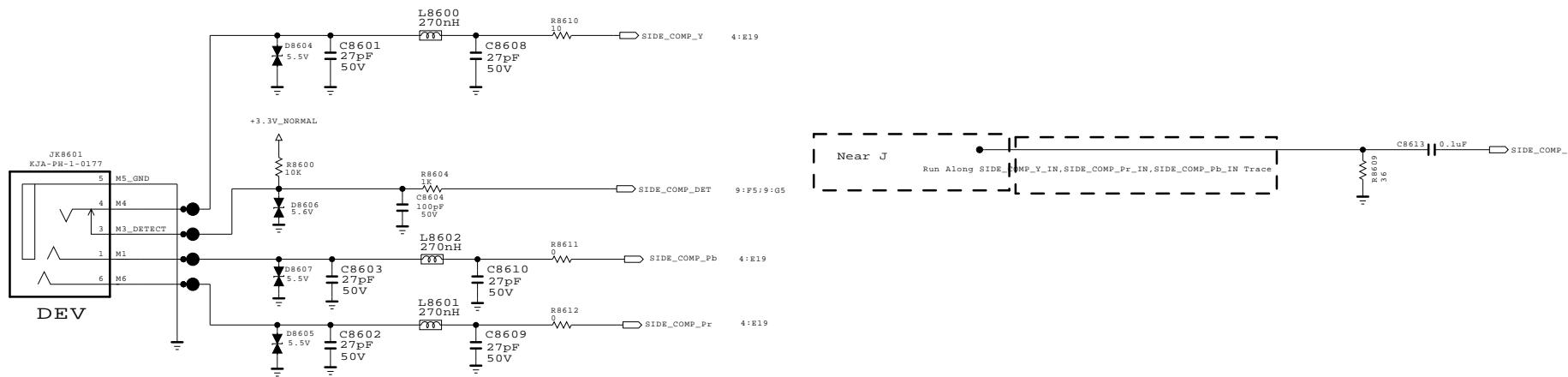
SECRET
LG Electronics

LG ELECTRONICS

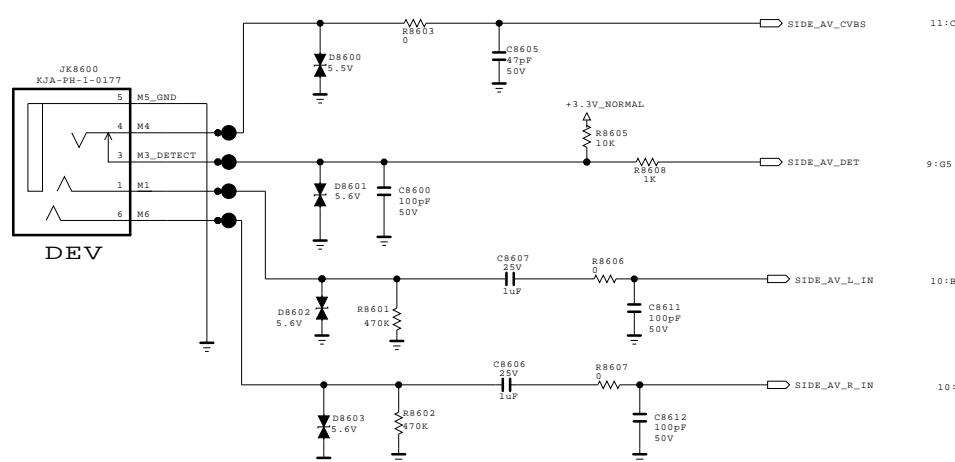
MODEL	COMMON	DATE
BLOCK	RGB/SPDIF	09/10/xx
		SHEET
		84 / 100

SIDE_GENDER

SIDE COMPONENT PHONE JACK



SIDE CVBS PHONE JACK



SIDE_COMPONENT_PHONE_JACK
 SIDE_CVBS_PHONE_JACK
 SIDE_HEAD_PHONE_JACK

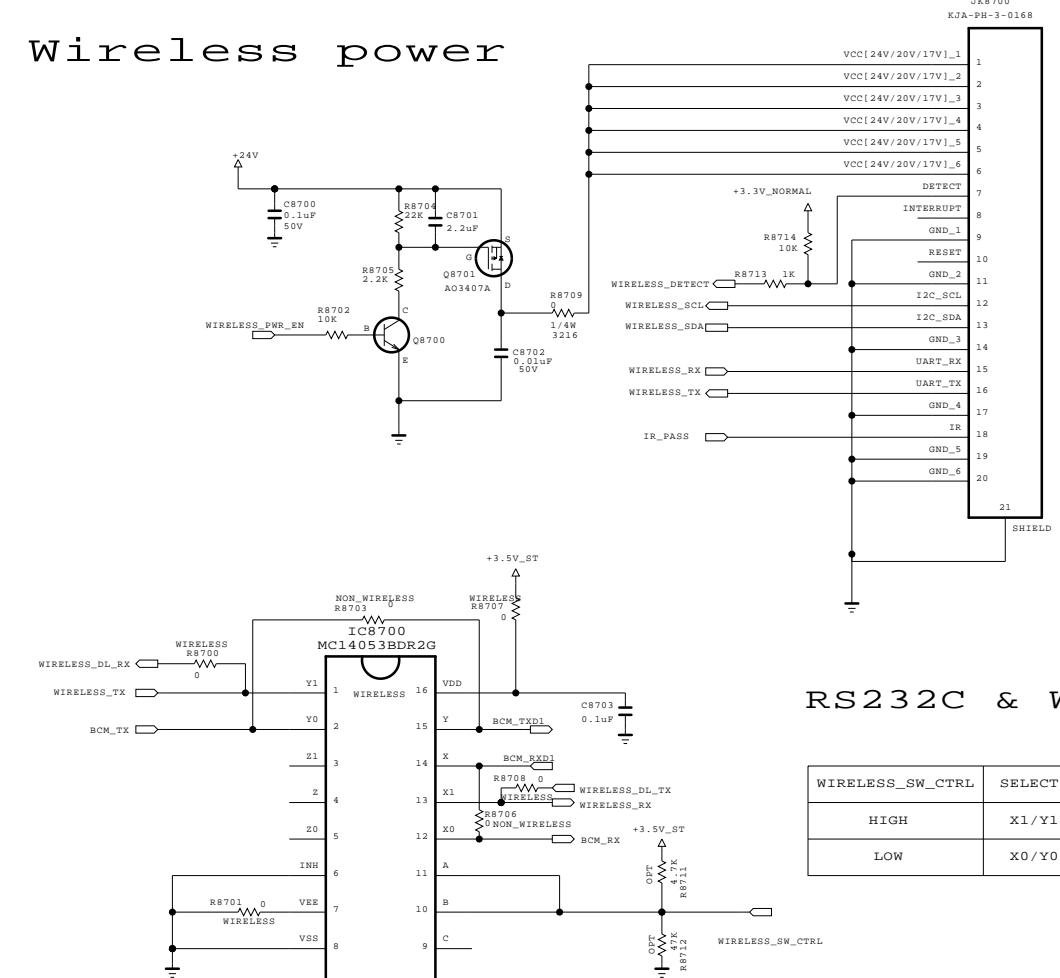
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SECRET
 LG Electronics

 LG ELECTRONICS

MODEL	COMMON	DATE	09/10/xx
BLOCK	SIDE_GENDER	SHEET	86 / 100

Wireless power



RS232C & Wireless

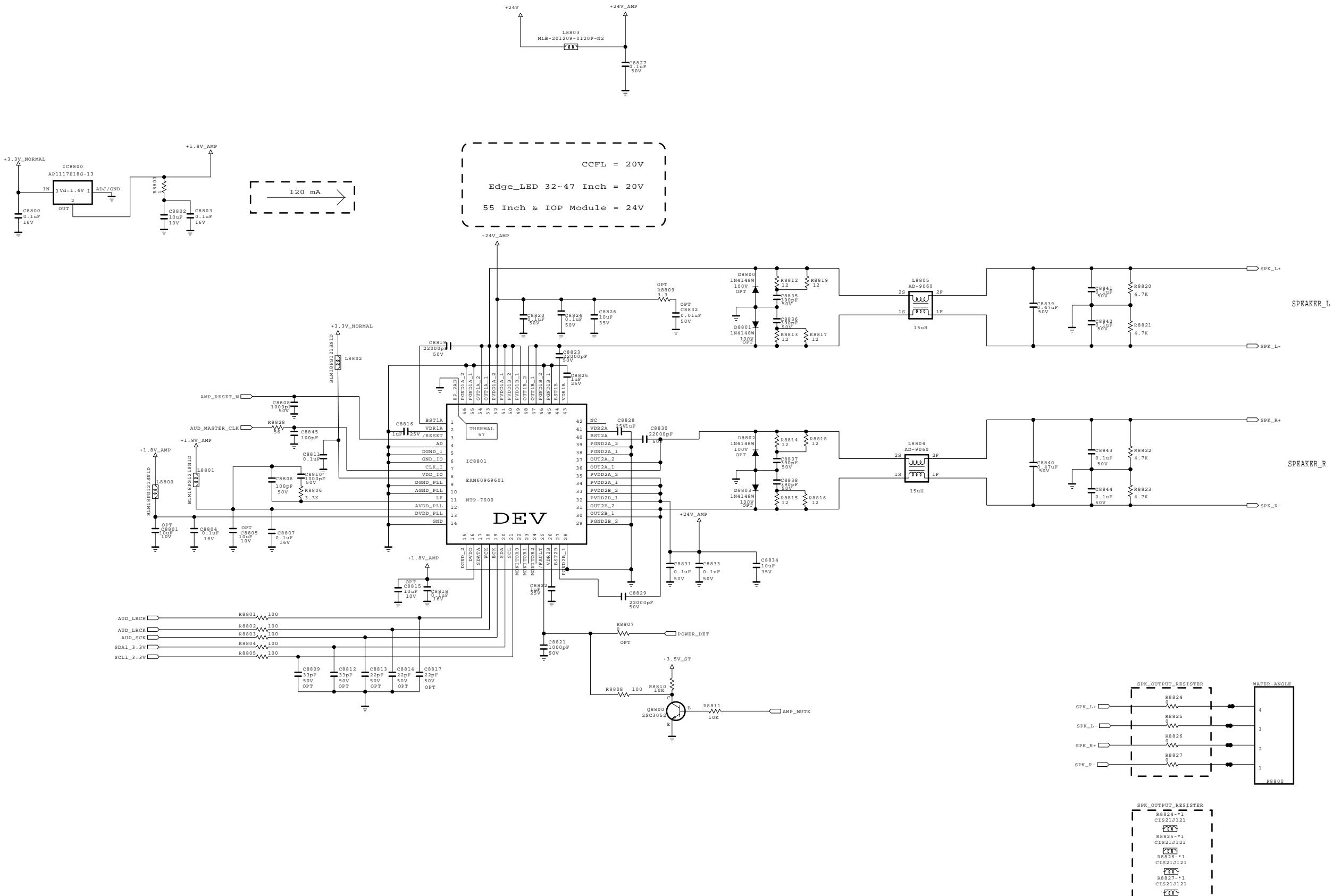
WIRELESS_SW_CTRL	SELECT PIN	STATUS
HIGH	X1/Y1/Z1	WIRELESS Dongle connect --> WIRELESS RS232
LOW	X0/Y0/Z0	WIRELESS Dongle Dis_con --> S7 RS232

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SECRET
LG Electronics



MODEL	COMMON	DATE	09/10/xx
BLOCK	WIRELESS	SHEET	87 / 100

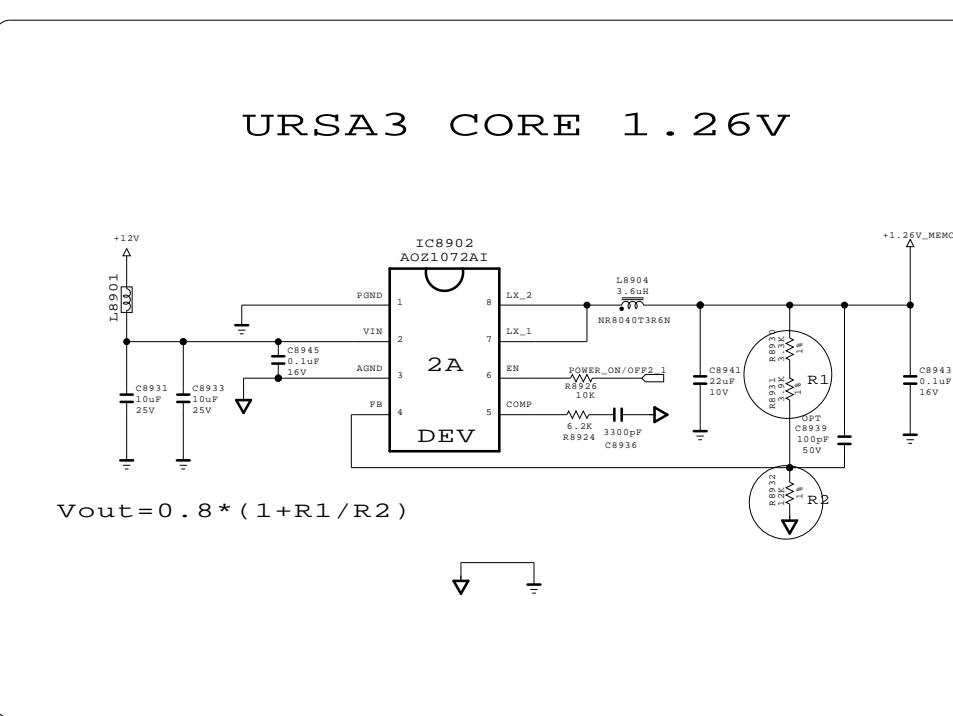
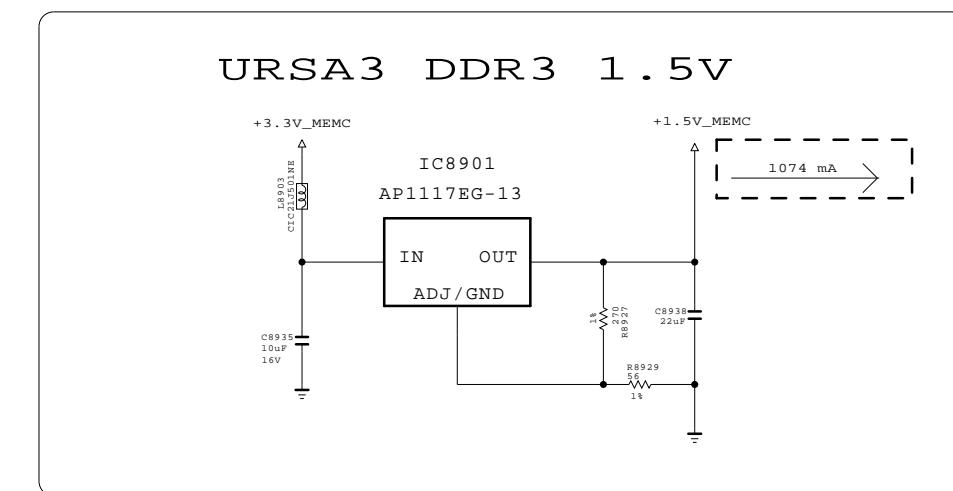
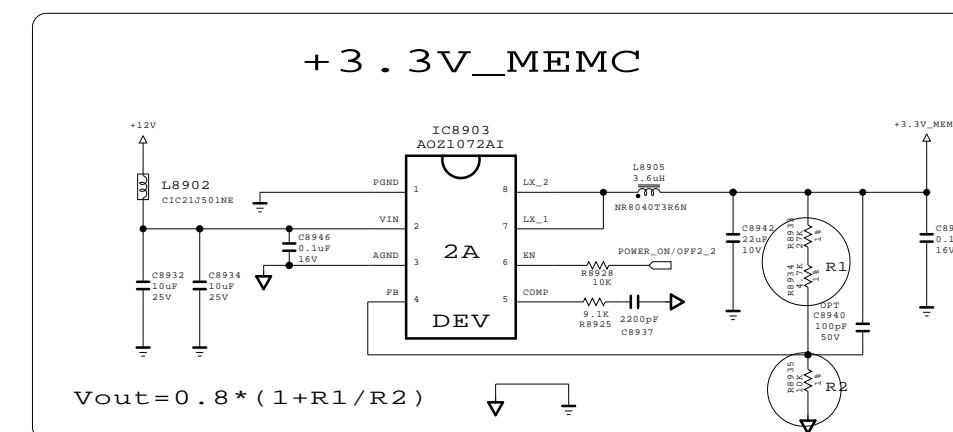
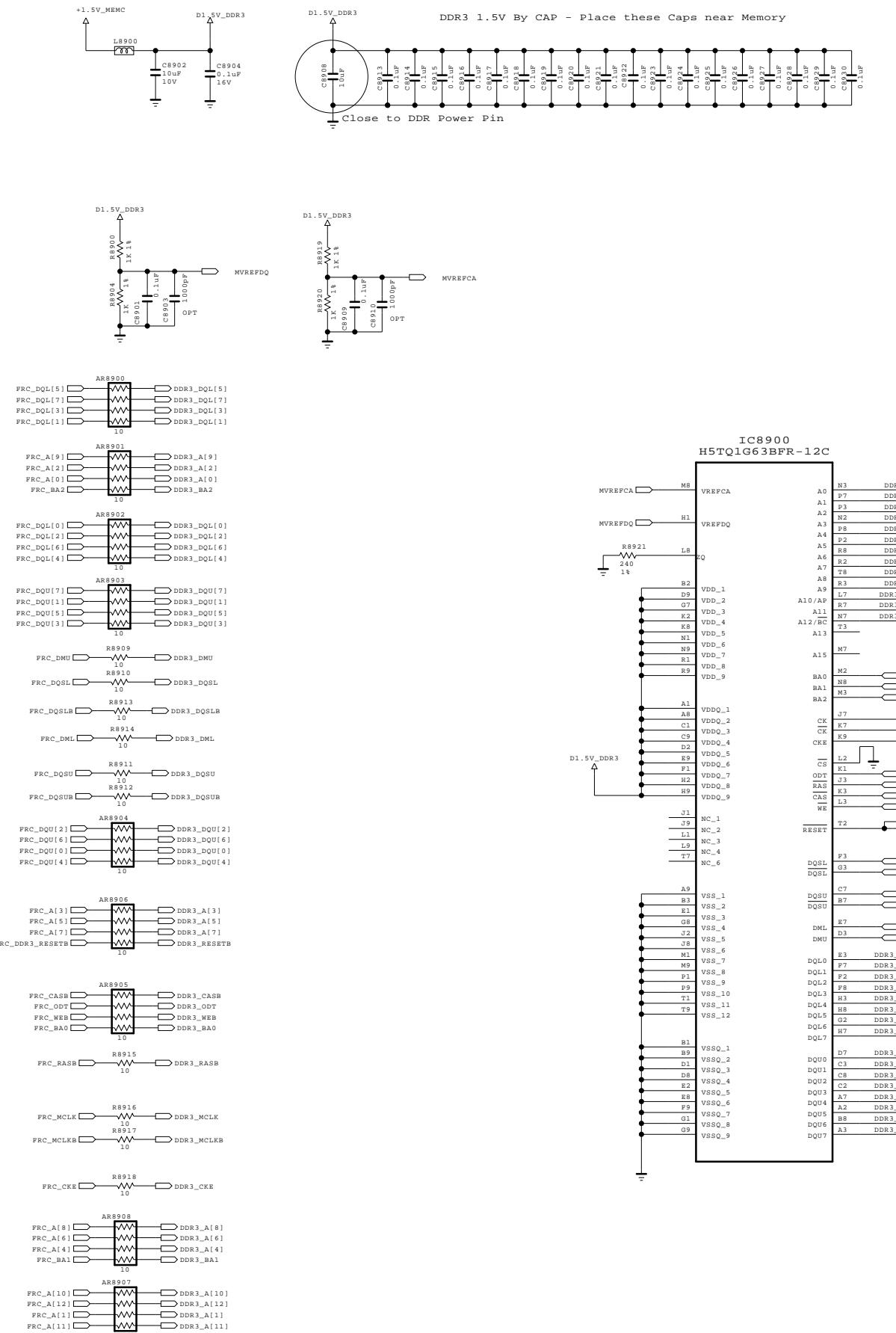


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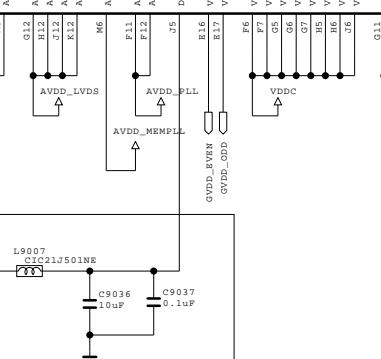
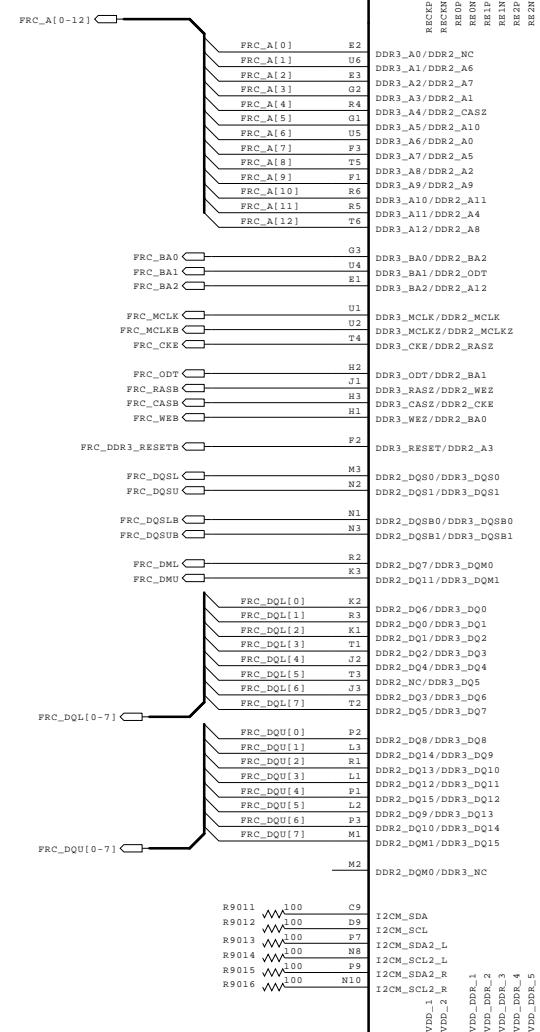
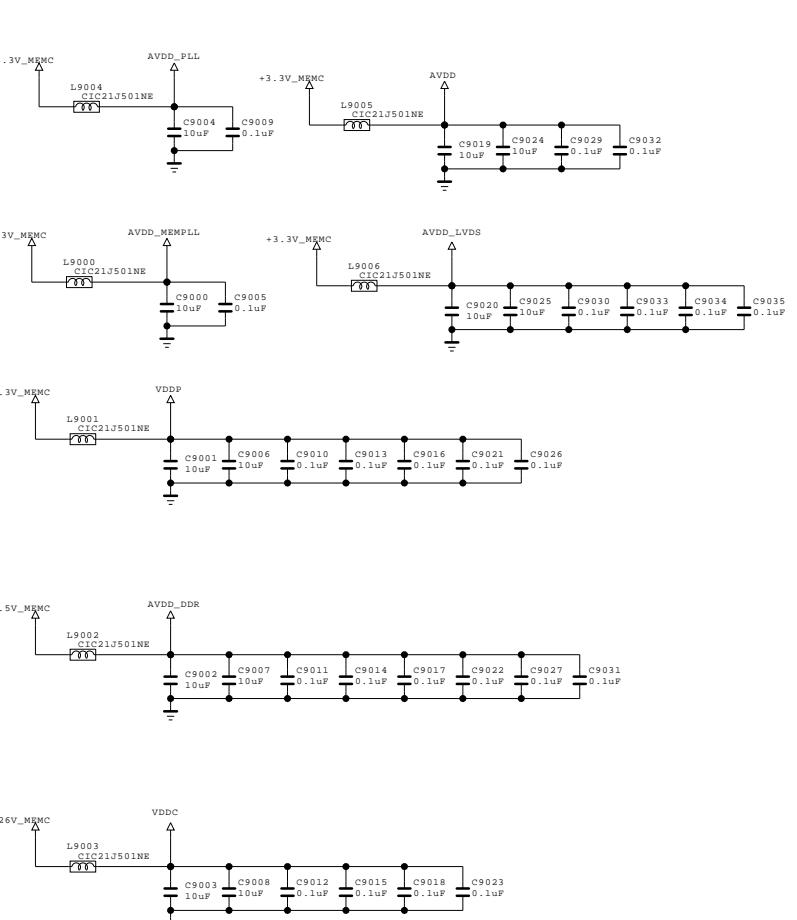
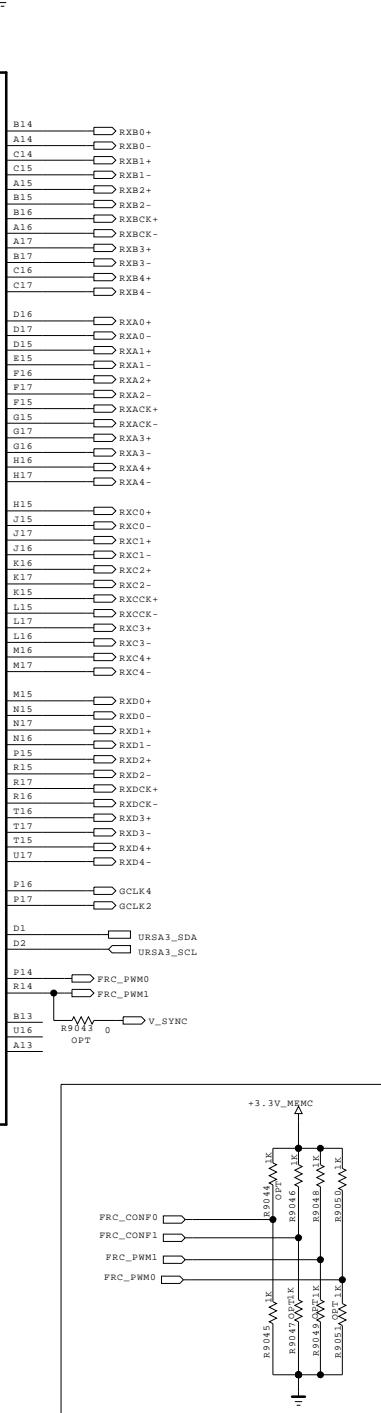
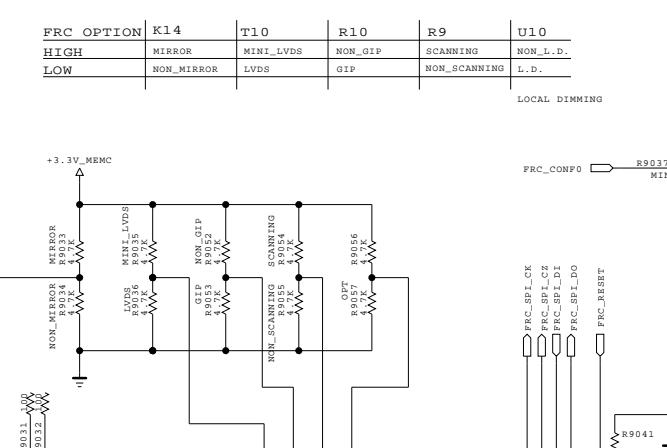
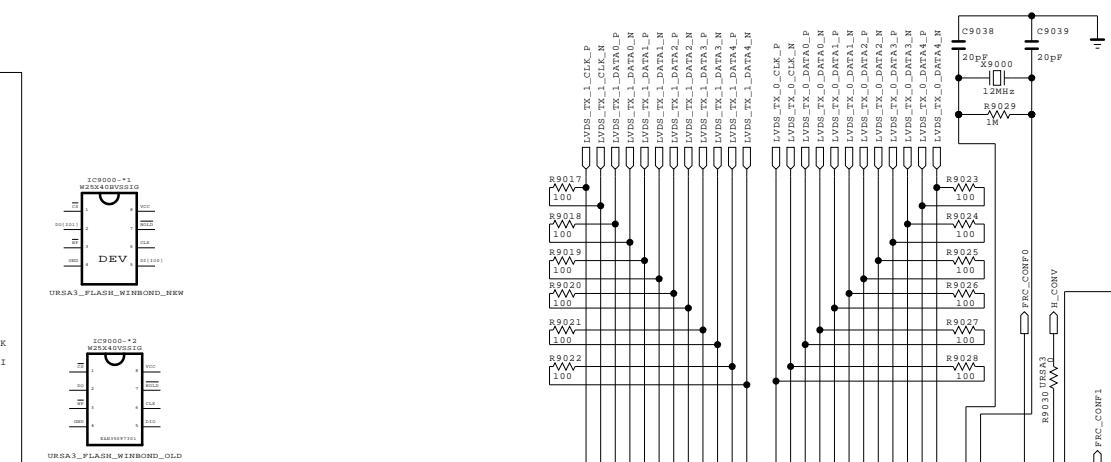
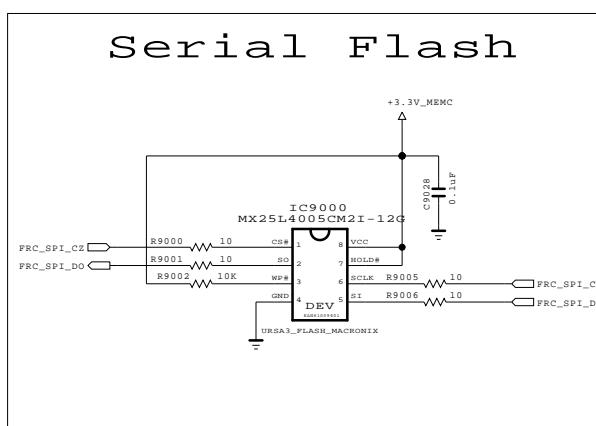
SECRET
LG Electronics

LG ELECTRONICS

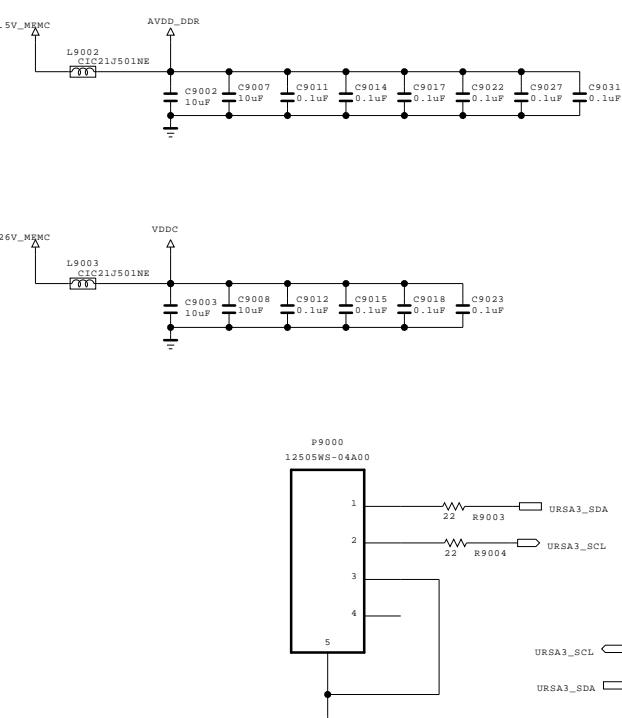
MODEL	COMMON	DATE	09/10/xx
BLOCK	NTP7000	SHEET	88 / 100

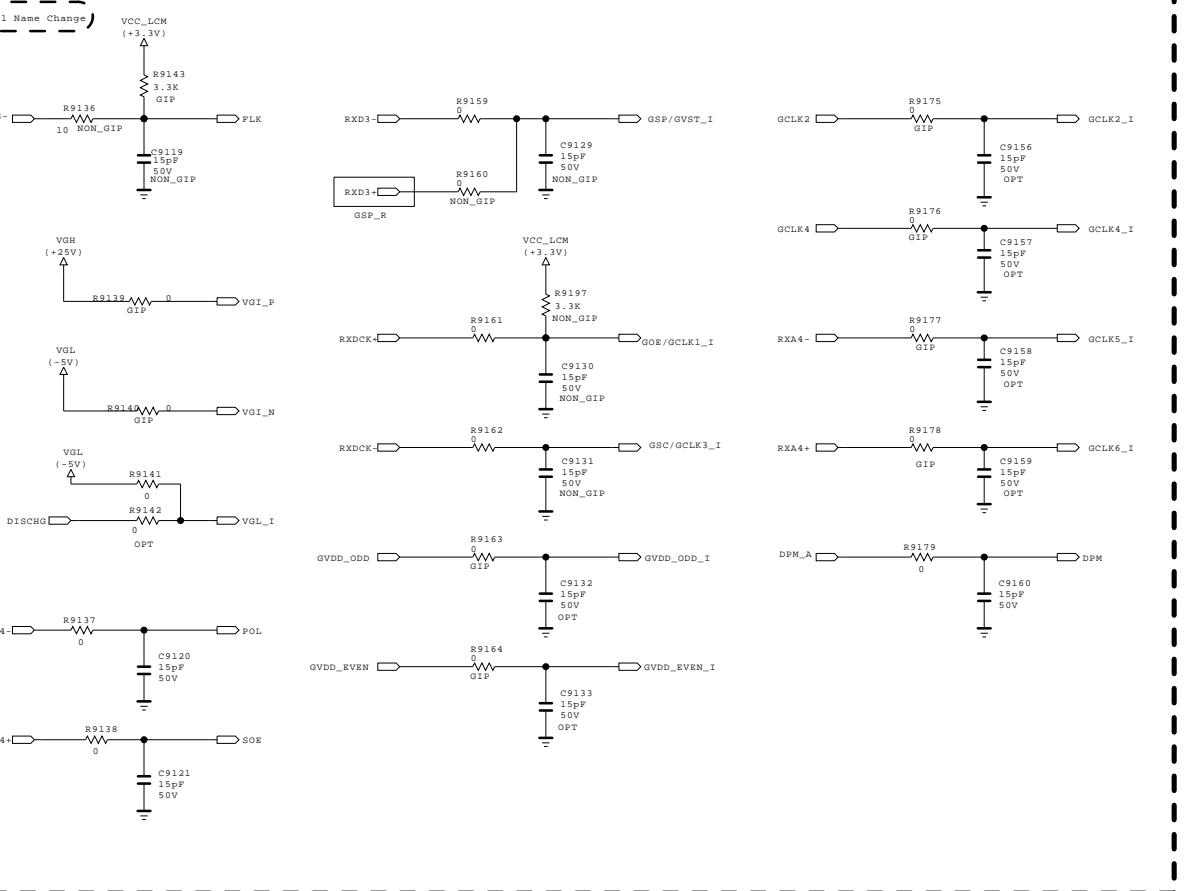
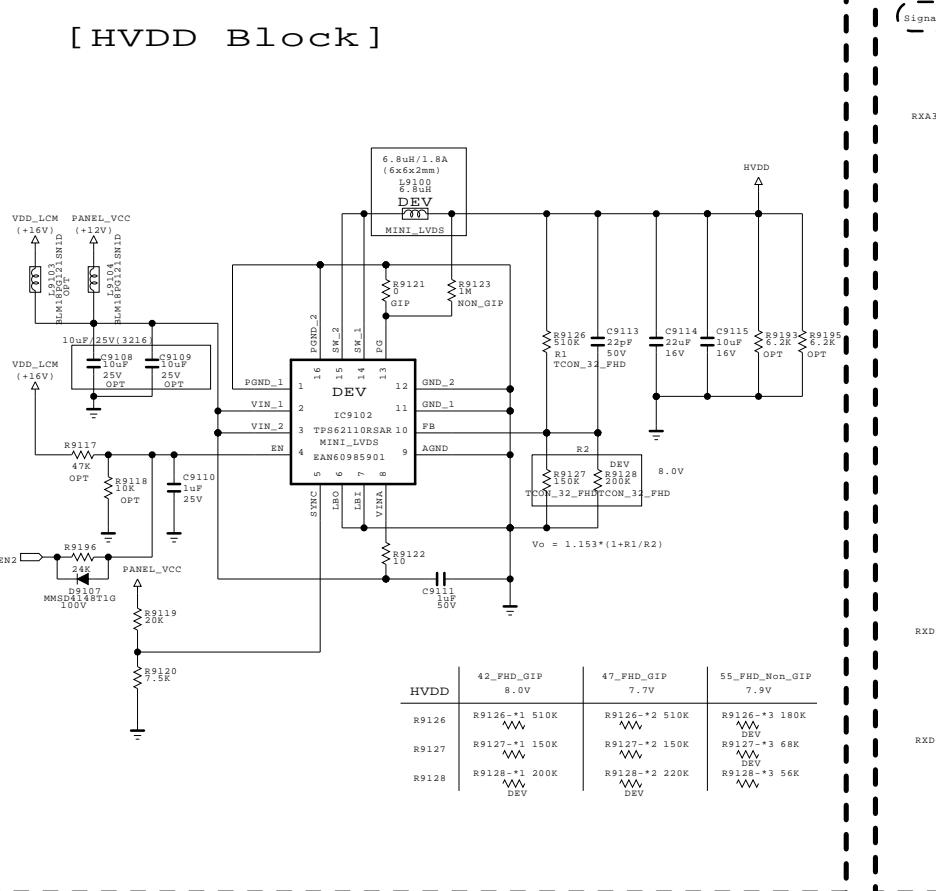
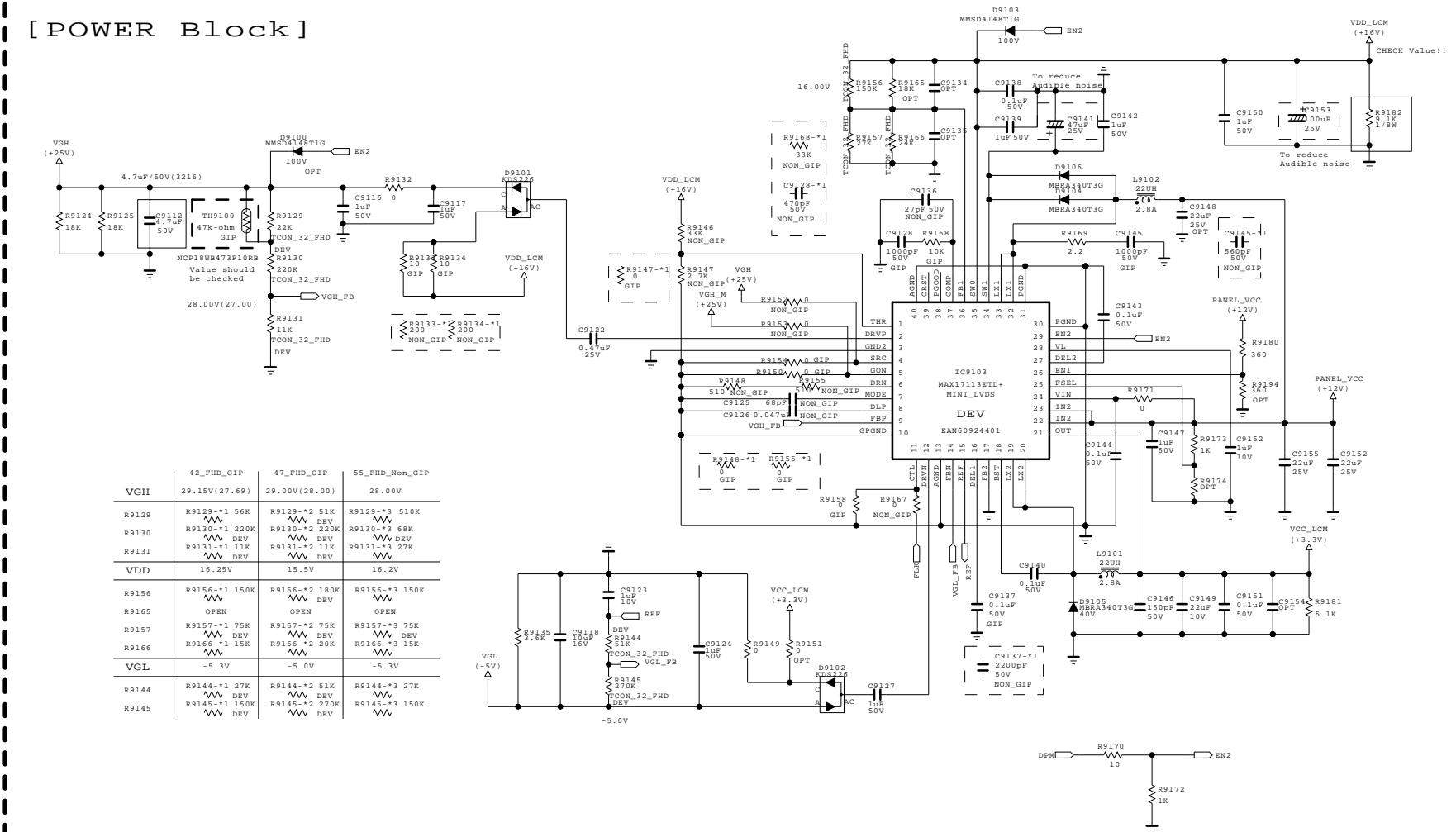
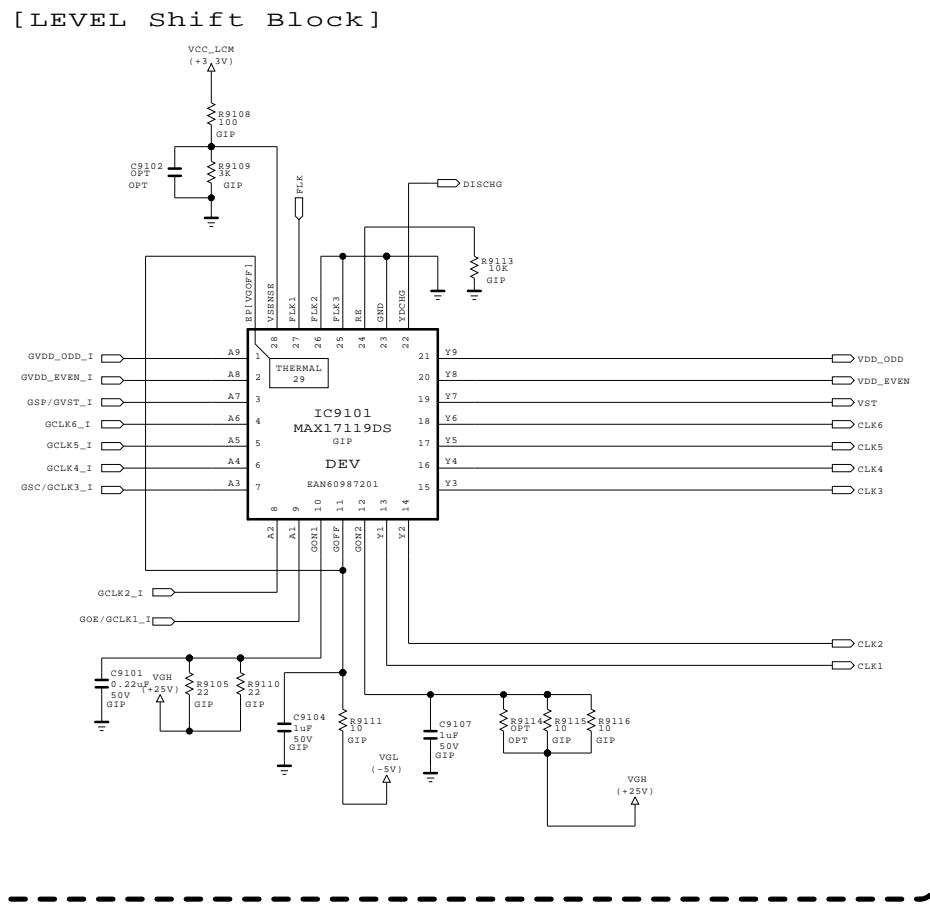


THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURED SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.



Separate DVDD_DDR Power





THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LG Electronics

LG ELECTRONICS

<u>MODEL</u>	COMMON	<u>DATE</u>	09/09/10
<u>BLOCK</u>	T-Con (NO L.D.)	<u>SHEET</u>	91 /

INDEX

SHEET 001	COMPONENT/AV REAR	Must be included in any PCB	NOT USE
SHEET 002	HDMI_POWER		
SHEET 003	USB/EAR-PHONE		
SHEET 004	SIDE_GENDER LINE		
SHEET 005	SMD_GASKET		
SHEET 006	BCM-DDR		
SHEET 007	ATSC_TUNER		
SHEET 008	BLANK		
SHEET 009	BCM-BOOT/FLASH/GPIO		
SHEET 010	BCM-LVDS/AUDIO		
SHEET 011	BCM-VIDEO		
SHEET 012	BLANK		
SHEET 013	BCM-POWER		
SHEET 014	BLANK		
SHEET 015	CHB		
SHEET 016	BLANK NECESSARY		
SHEET 017	BLANK		
SHEET 018	BLANK		
SHEET 019	BLANK		
SHEET 020	MOTION REMOCON		
SHEET 021	AMP_SUB_NTP	NECESSARY	Must be included in any PCB
SHEET 022	LG_LOGO_LE9500		
SHEET 023	LVDS_LE9500		
SHEET 024	3D_IR_GENDER / POWER		
SHEET 025	BLANK		
SHEET 026	BLANK		
SHEET 027	BLANK SELECTABLE		
SHEET 028	BLANK		
SHEET 029	BLANK		
SHEET 030	BLANK		
SHEET 031	SHEET 073 BLANK		
SHEET 074	URSA3 120HZ MINI-LVDS		
SHEET 075	LG5111 120HZ MINI-LVDS		
SHEET 076	BCM 60HZ LVDS		
SHEET 077	URSA3 120HZ LVDS		
SHEET 078	LG5111 60HZ LVDS		
SHEET 079	LED DRIVER WAFER		
SHEET 080	POWER		
SHEET 081	MICOM		
SHEET 082	IR/232C/EHTERNET		
SHEET 083	HDMI SWITCH		
SHEET 084	RGB/SPDIF		
SHEET 085	SIDE_AV SELECTABLE		
SHEET 086	SIDE_GENDER		
SHEET 087	WIRELESS		
SHEET 088	AMP_NTP7000		
SHEET 089	URSA3-DDR/POWER		
SHEET 090	URSA3 (NO L.D.)	WITHOUT LOCAL DIMMING	
SHEET 091	T-CON (NO L.D.)		
SHEET 092	BLANK		
SHEET 093	LG5111 (L.D.) from URSA3	WITH LOCAL DIMMING T240Hz	
SHEET 094	URSA3 (L.D.)		
SHEET 095	T-CON (L.D.) SELECTABLE		
SHEET 096	BLANK		
SHEET 097	LG5111 (L.D.) from BCM	WITH LOCAL DIMMING T4800Hz	
SHEET 098	BLANK		
SHEET 099	BLANK		

THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.

SECRET
LG Electronics

LG ELECTRONICS

MODEL	GP2_BCM_ATSC	DATE	09/10/xx
BLOCK	INDEX	SHEET	100 / 100



LG Electronics Inc.

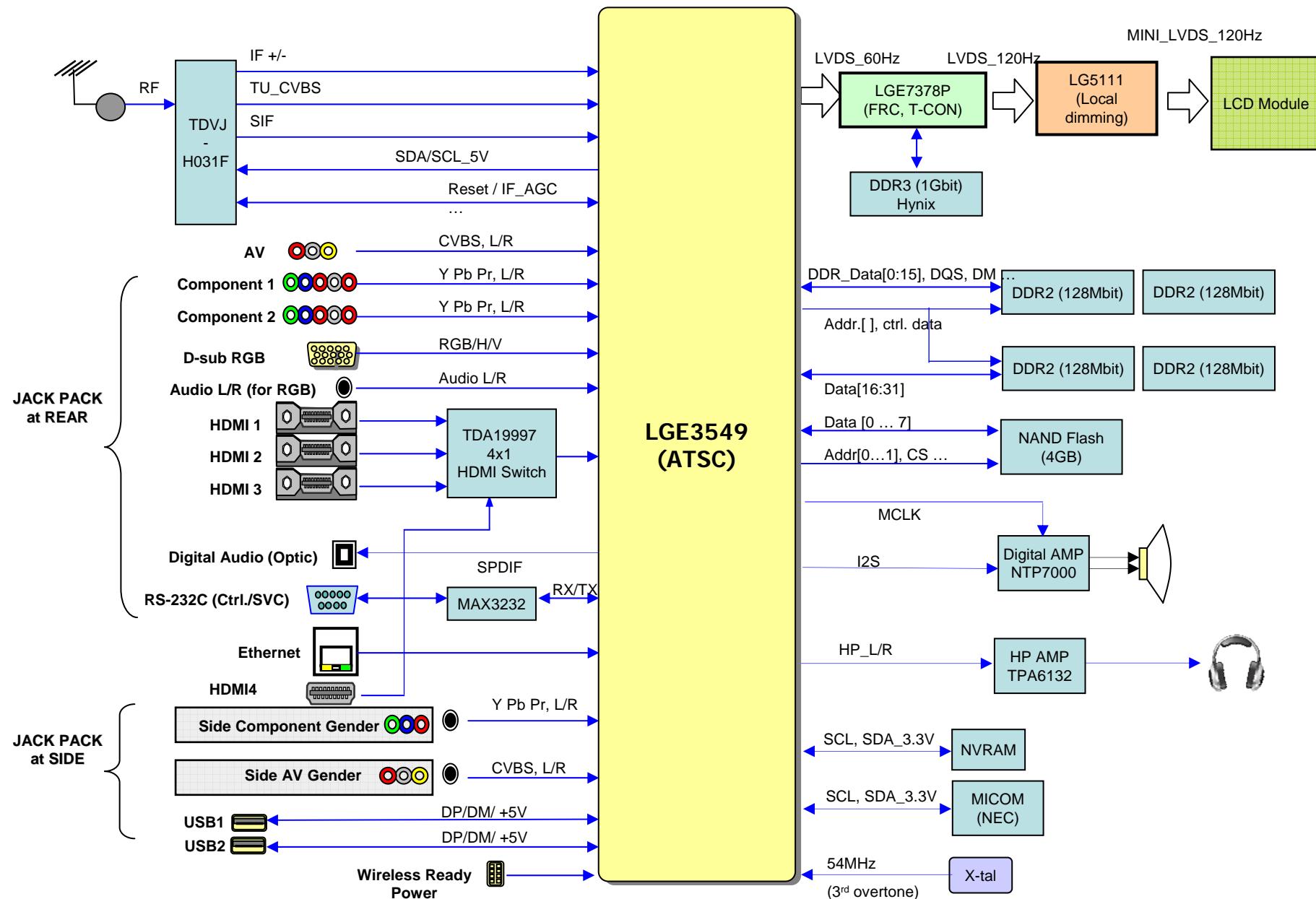
GP2-BCM (ATSC) trouble shooting guide

Applied chassis: LA02D
Applied models : 32/42/47/55LE5400-UC

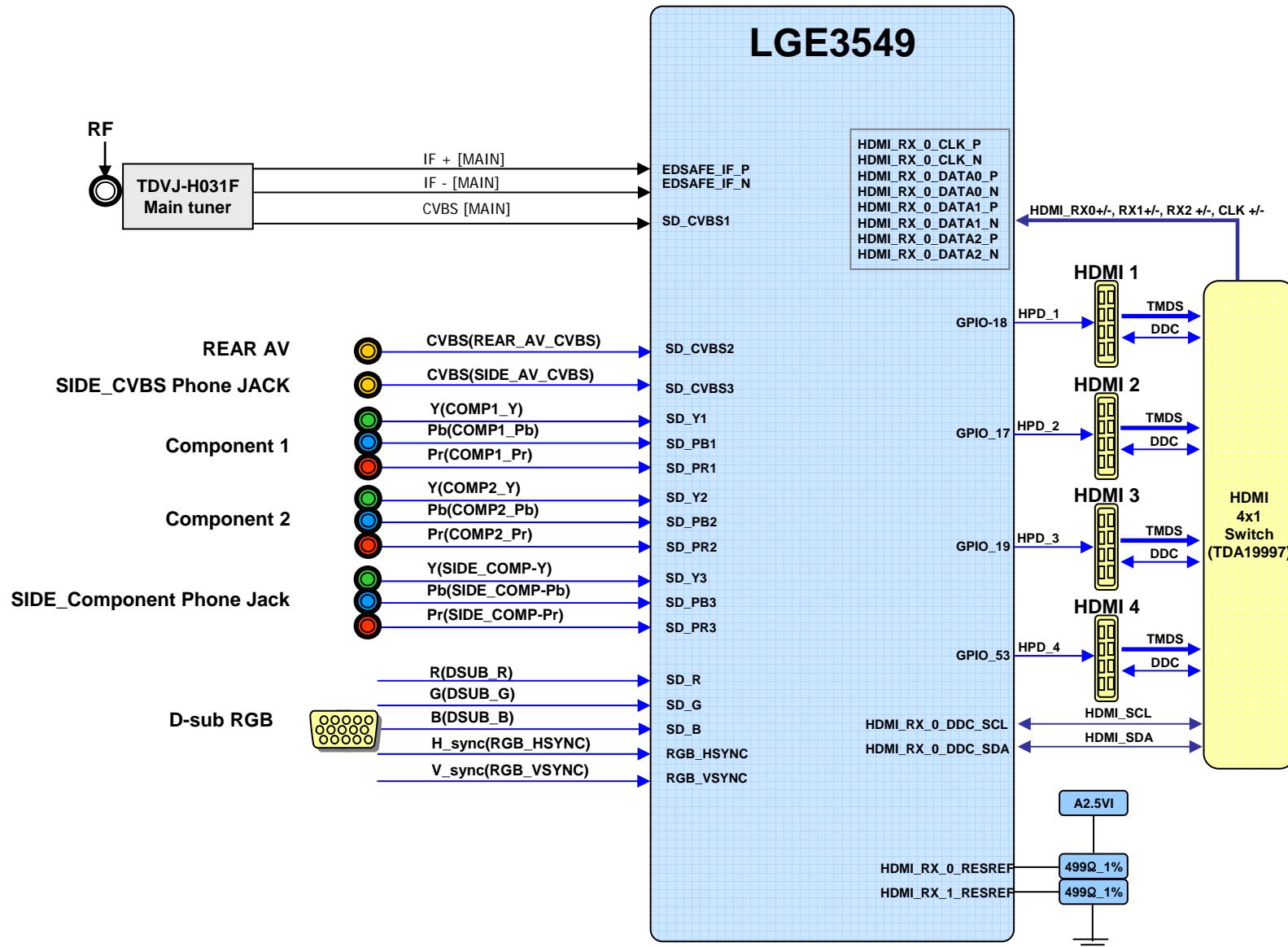


LG Electronics/ LCD TV Division
LCD TV AT1 Gr.

1. Overview for LGE3549 (ATSC) - US

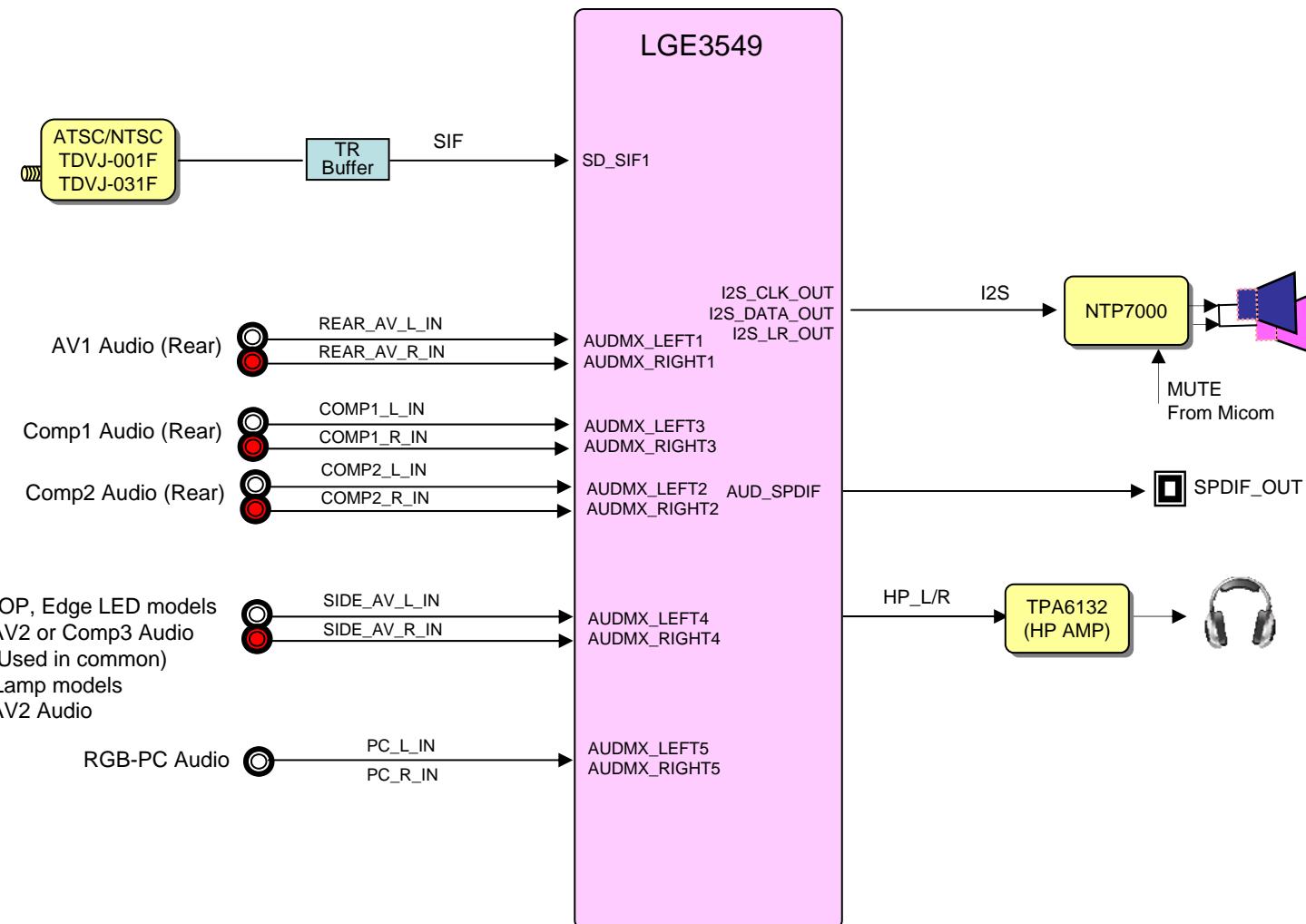


2. Video Signal block



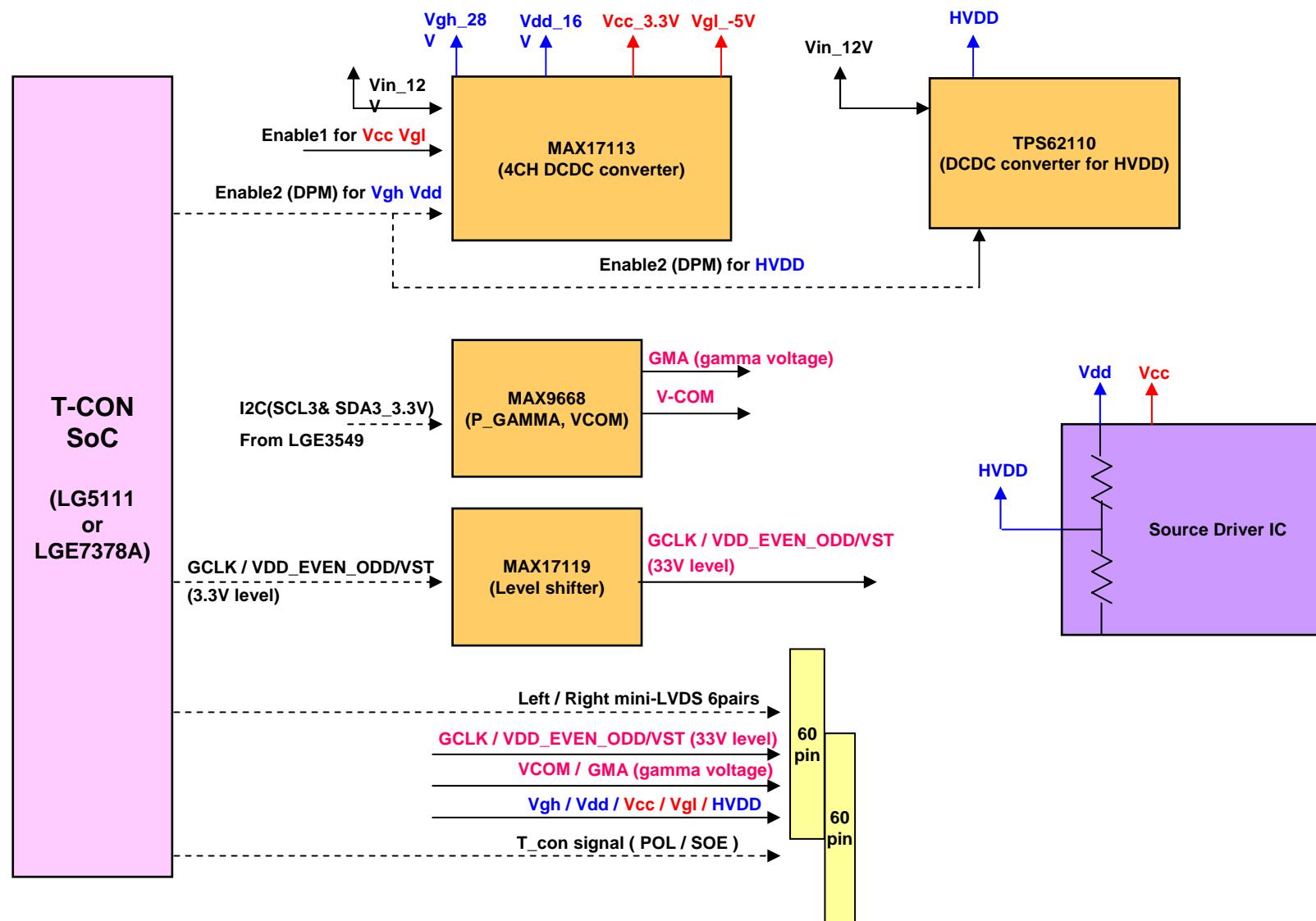
* Each of analog audio signals shall be designed with "Common Mode (INCM) signal "

3. Audio Signal block

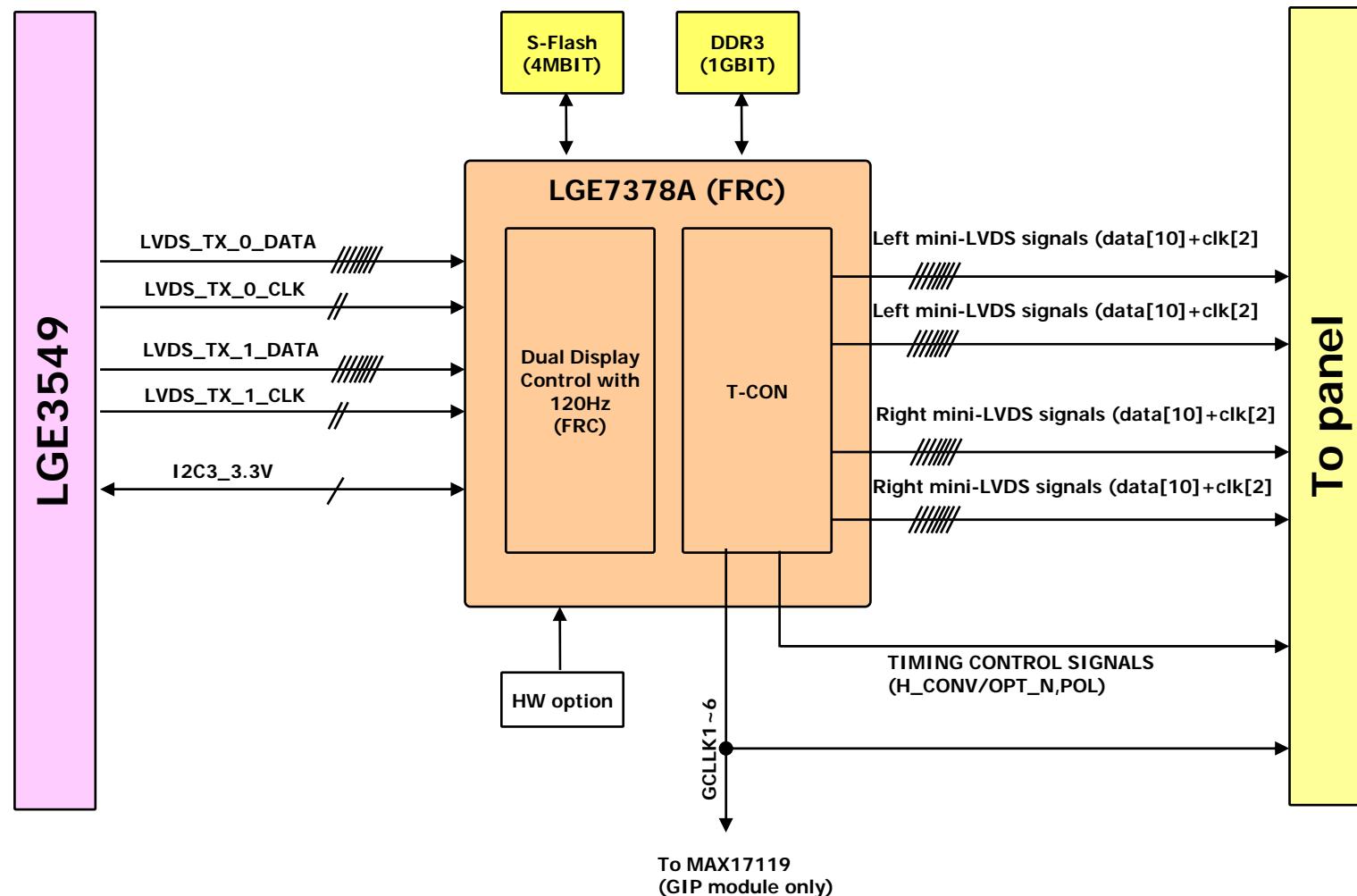


* Each of analog signals shall be designed with "Common Mode (INCM) signal "

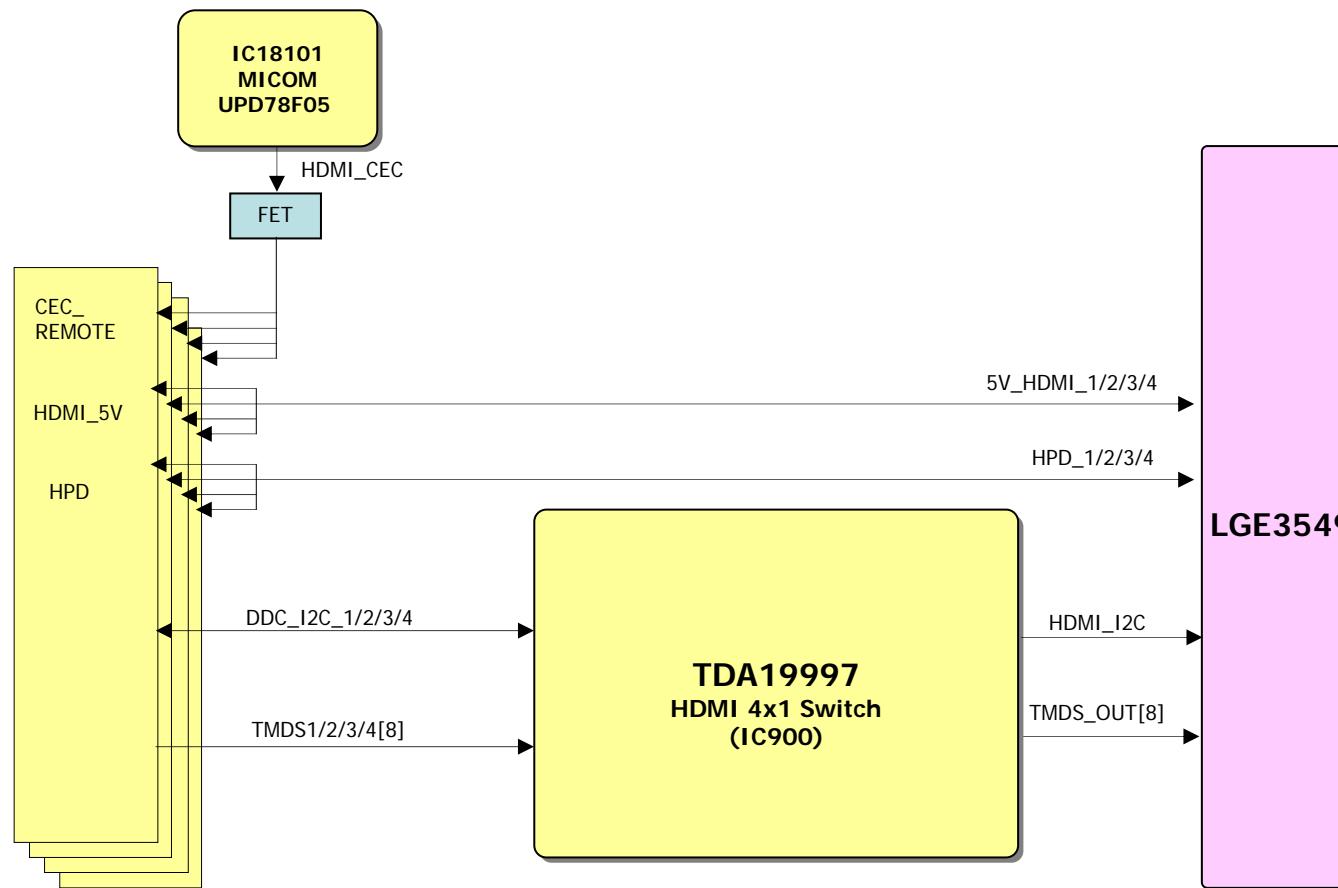
4. M+S block



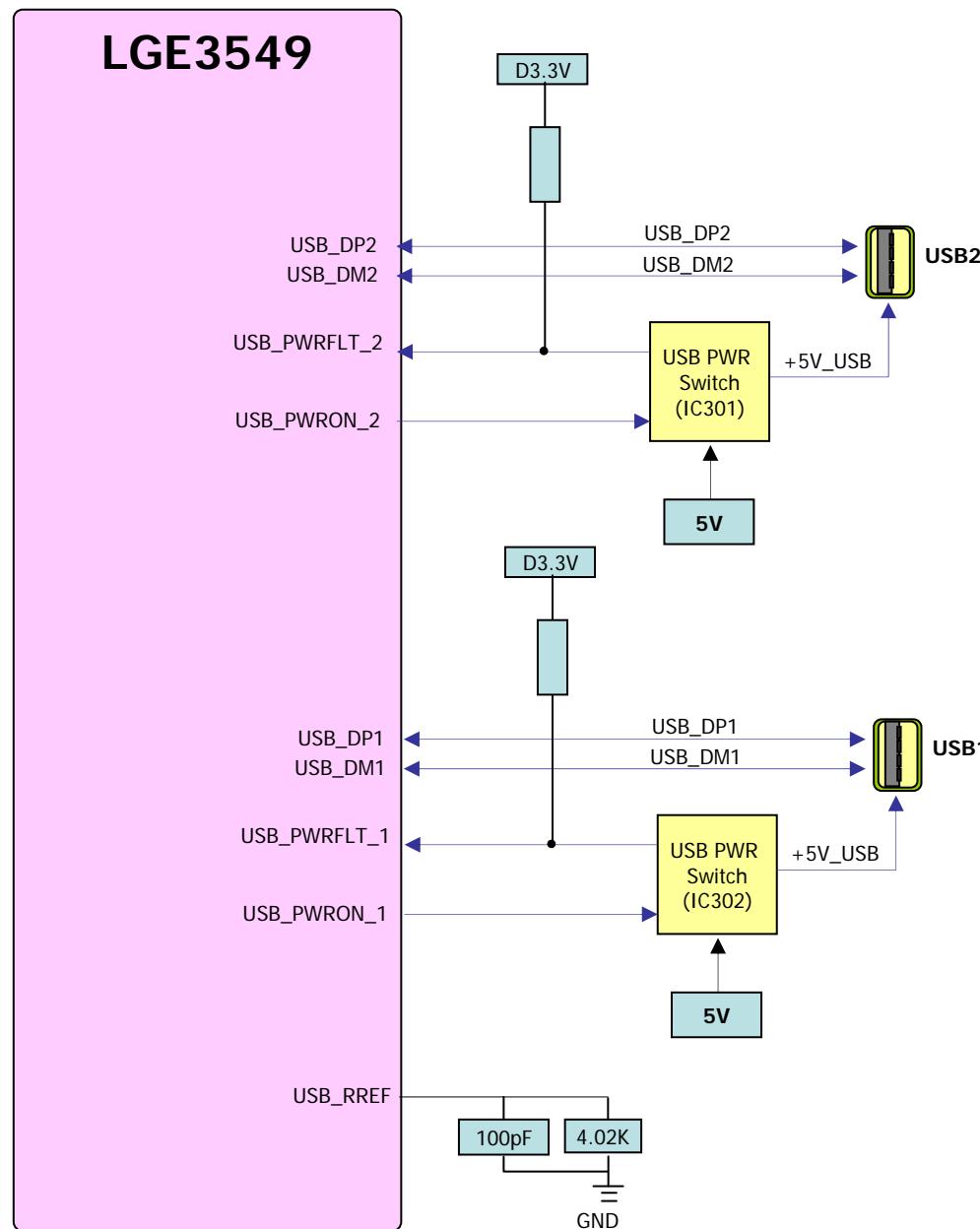
5. FRC (URSA3 – LGE7378A) block with mini-LVDS interface



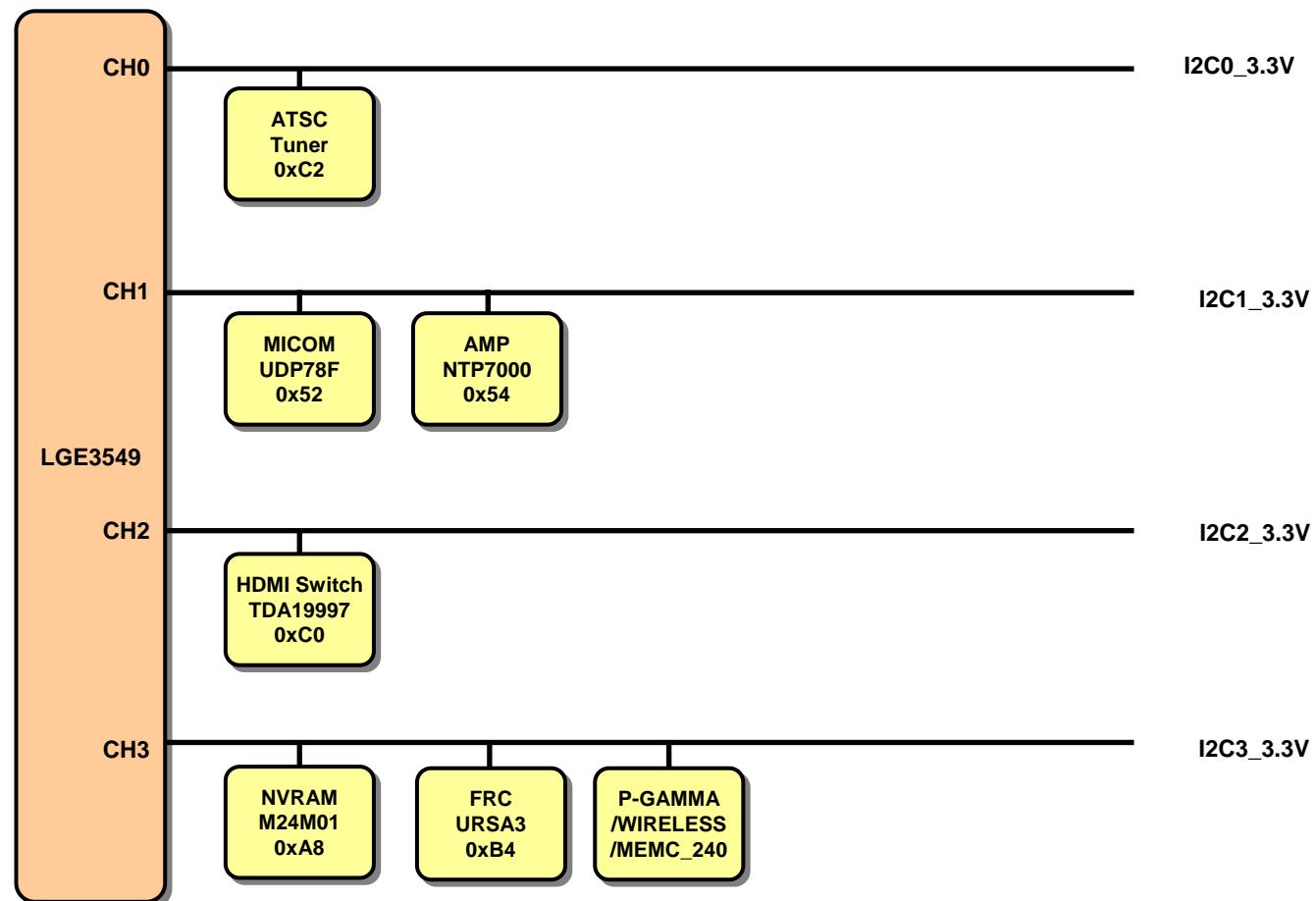
7. HDMI block



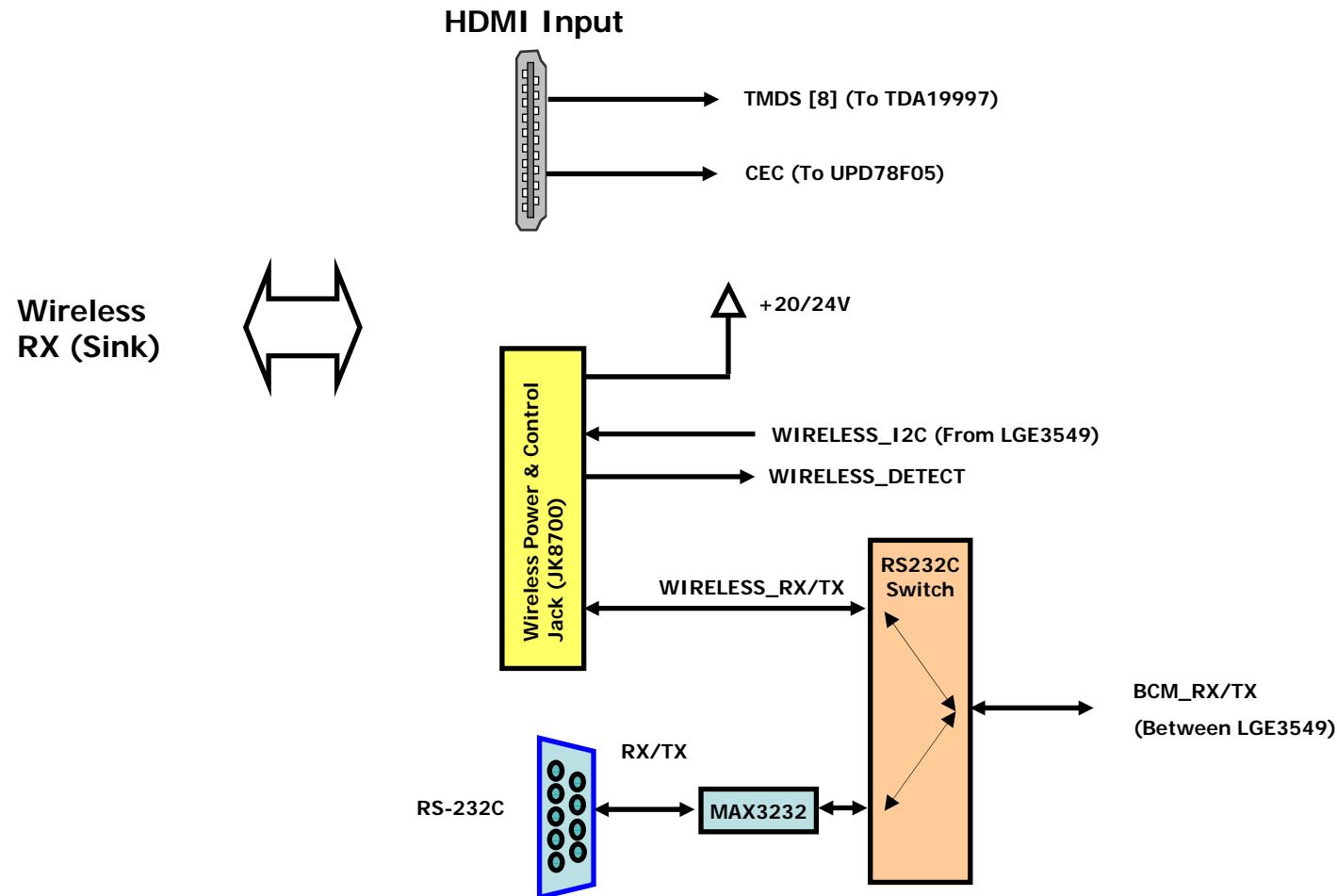
8. USB block



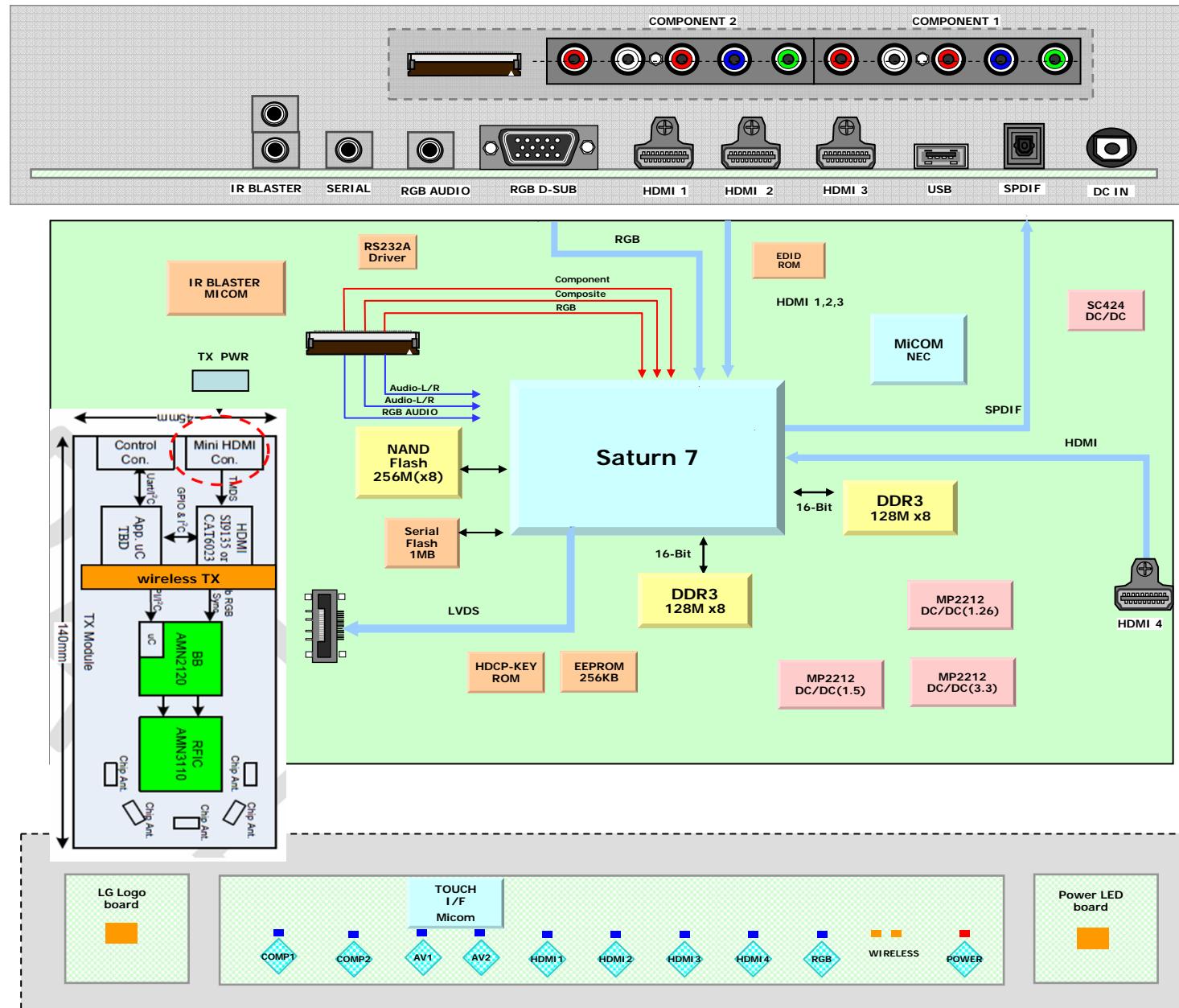
9. I²C Connections



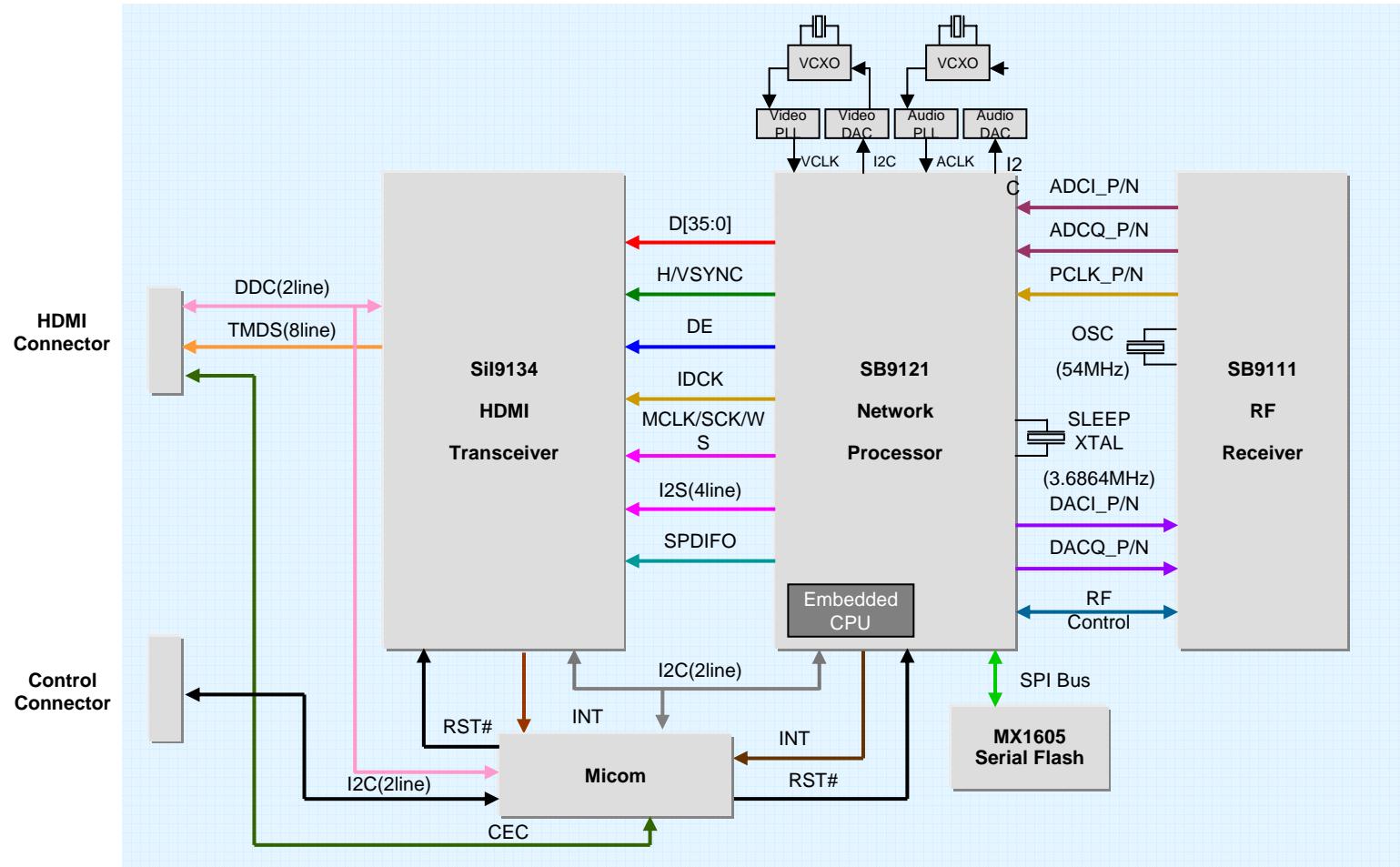
10. Wireless ready



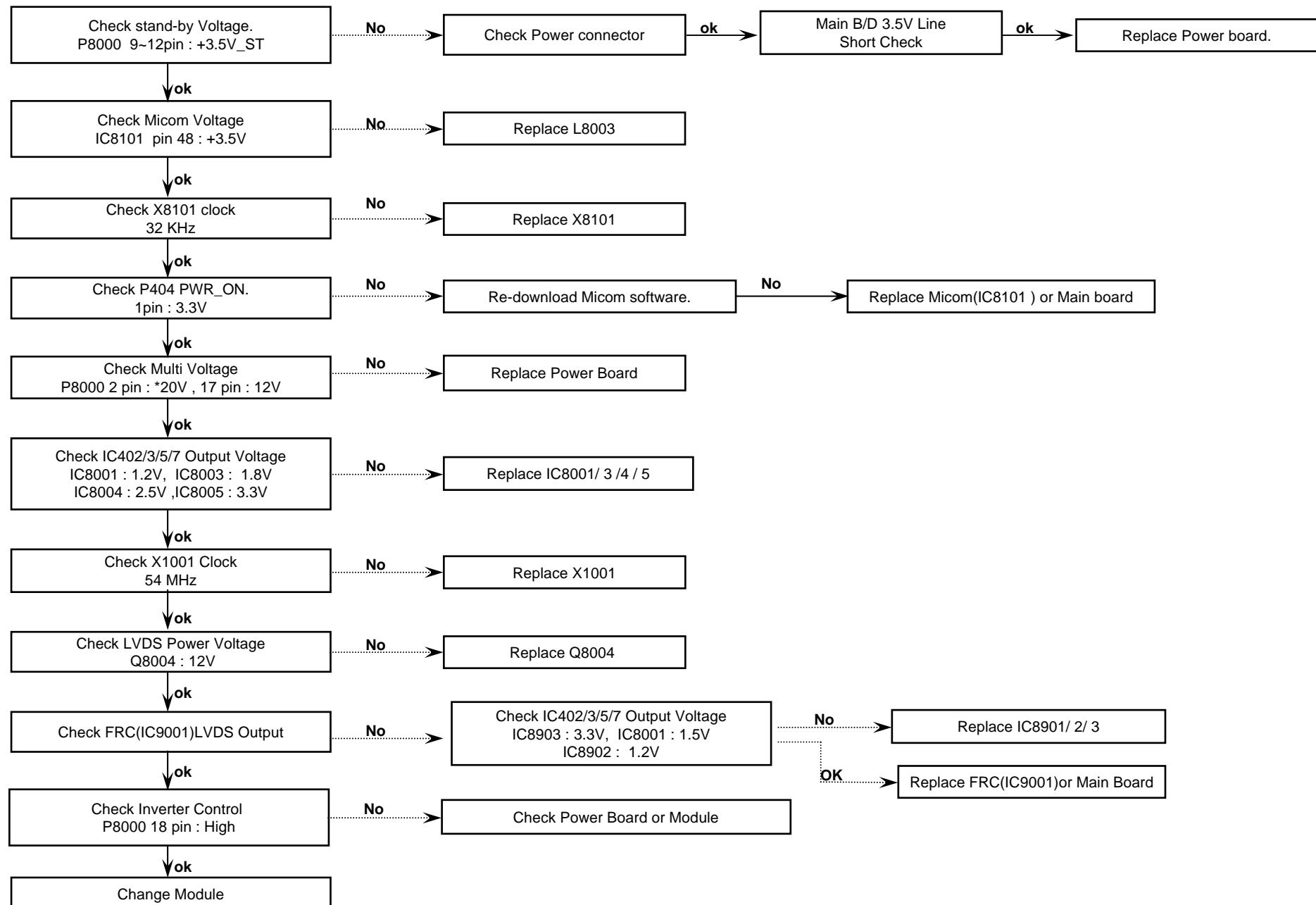
11. Wireless TX (Source) – AV BOX



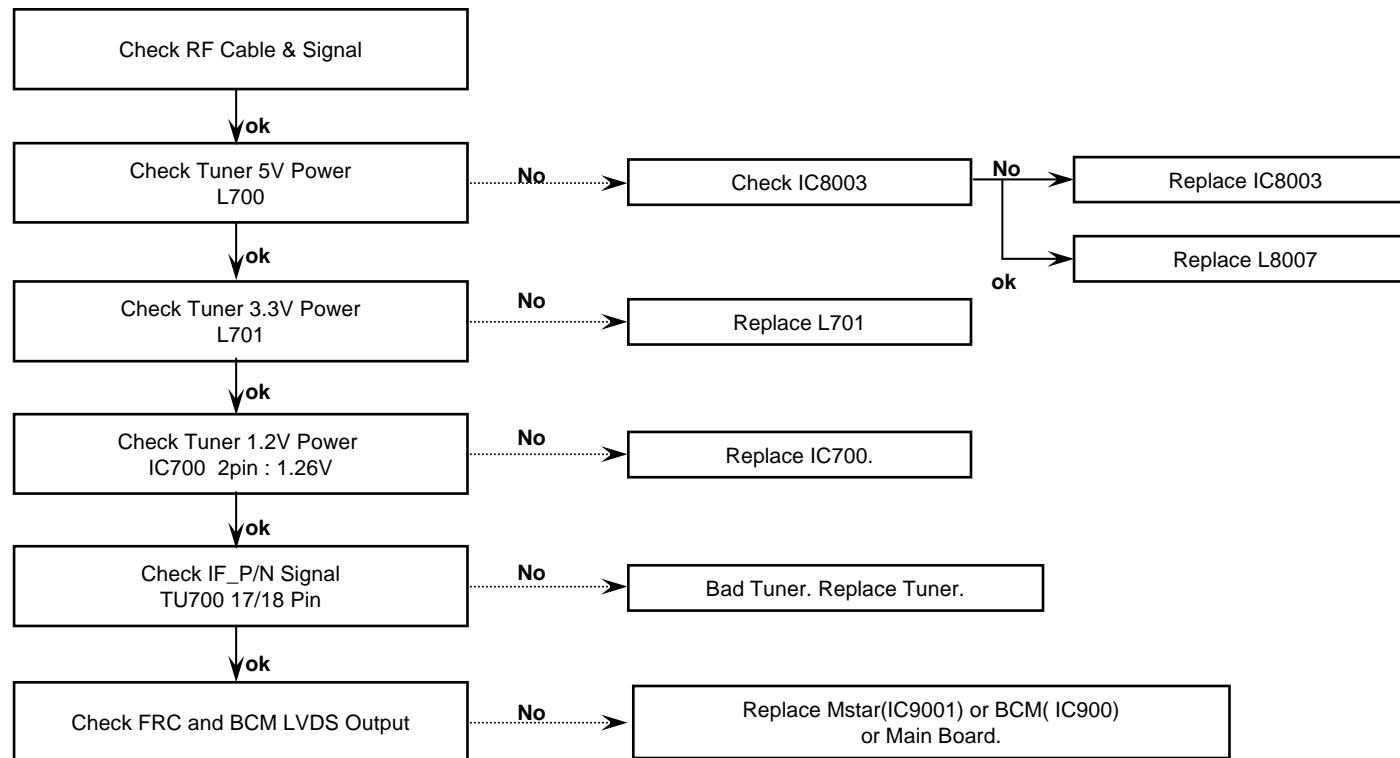
12. Wireless RX (Sink)



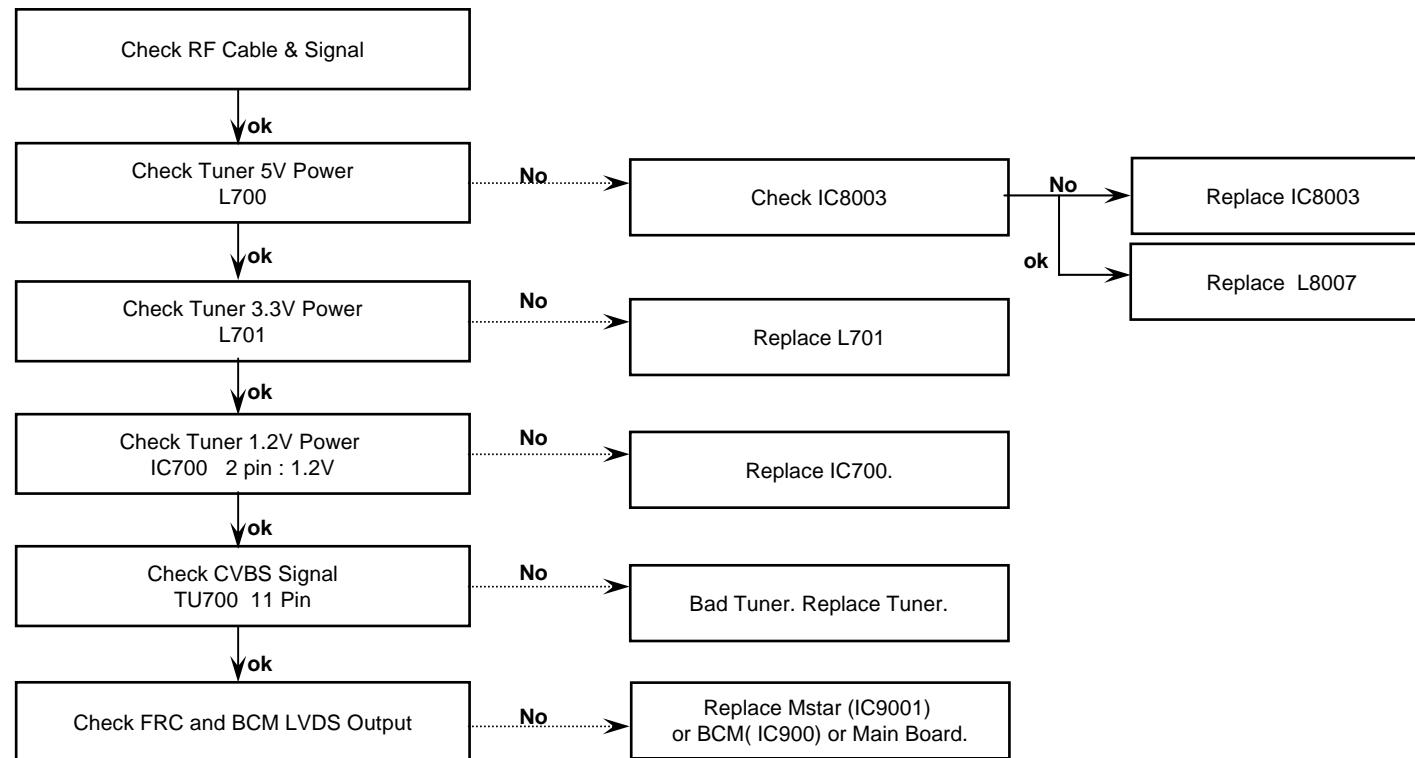
1. Trouble shooting - No power



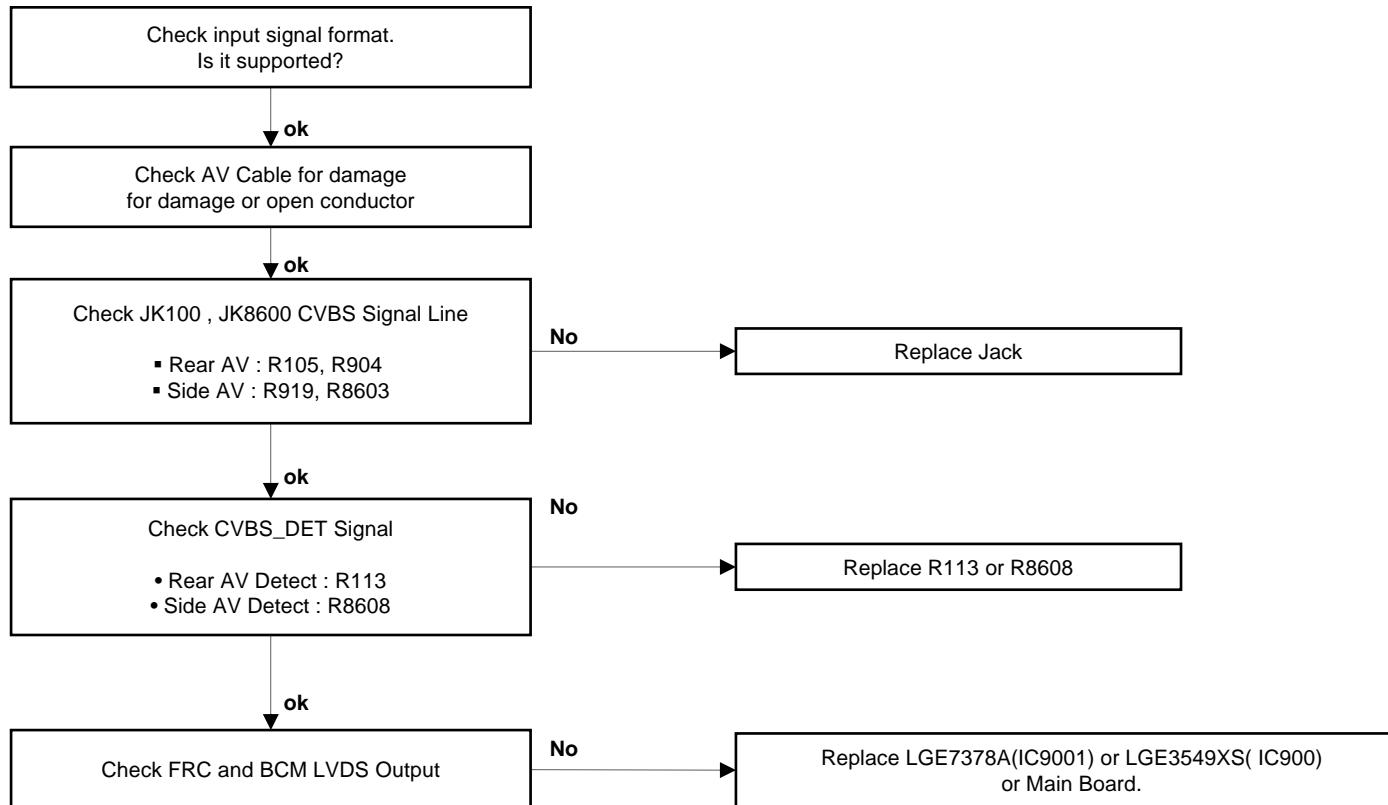
2. Trouble shooting - No video (Digital TV video)



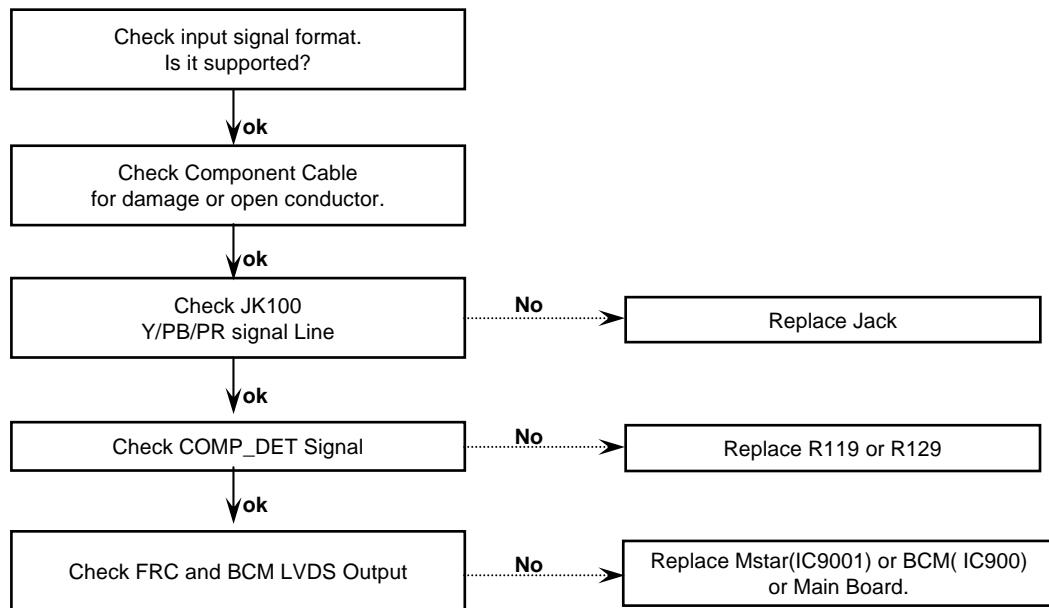
3. Trouble shooting - No video (Analog TV video)



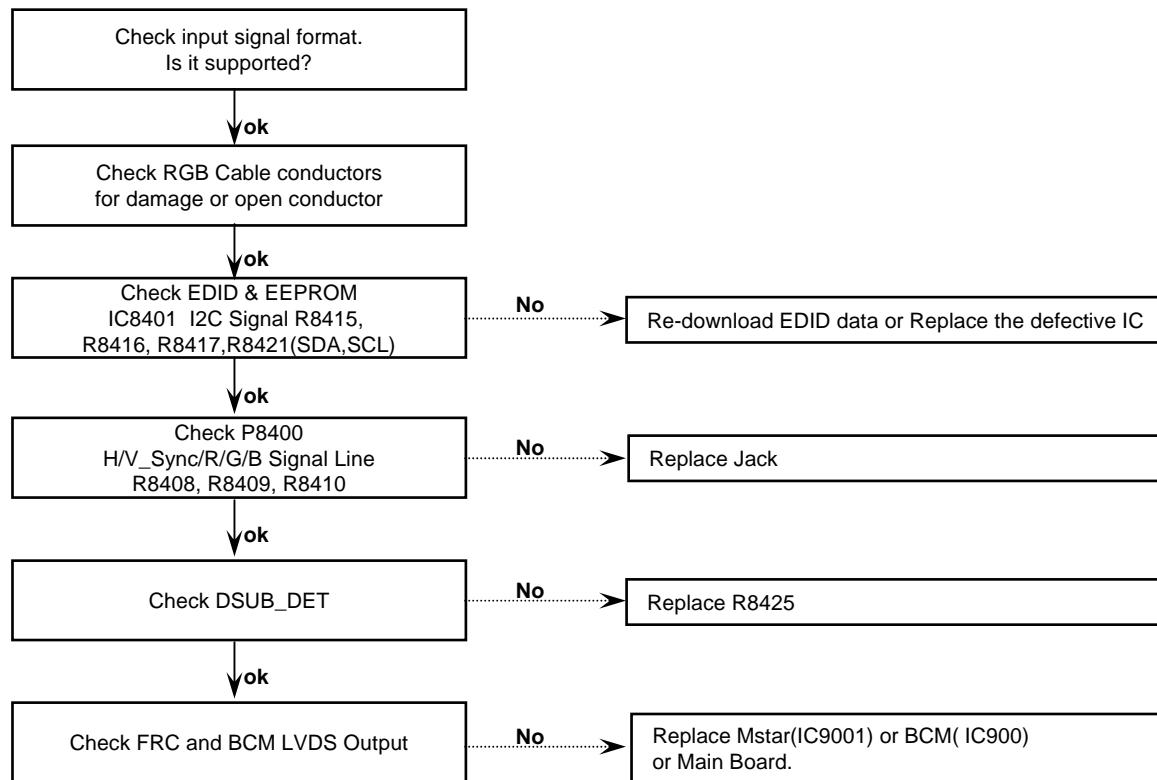
4. Trouble shooting - No video (AV)



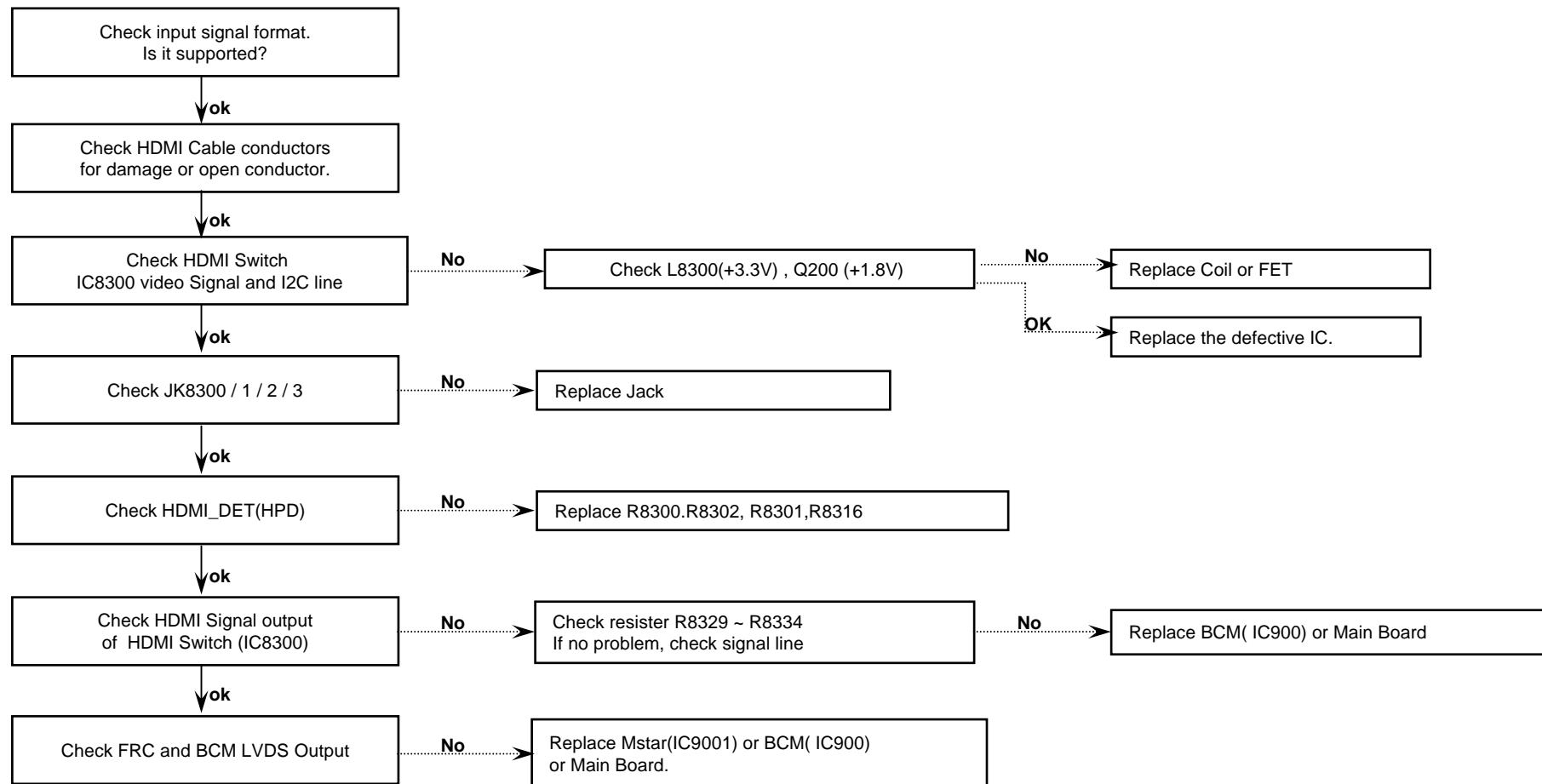
5. Trouble shooting - No video (Component)



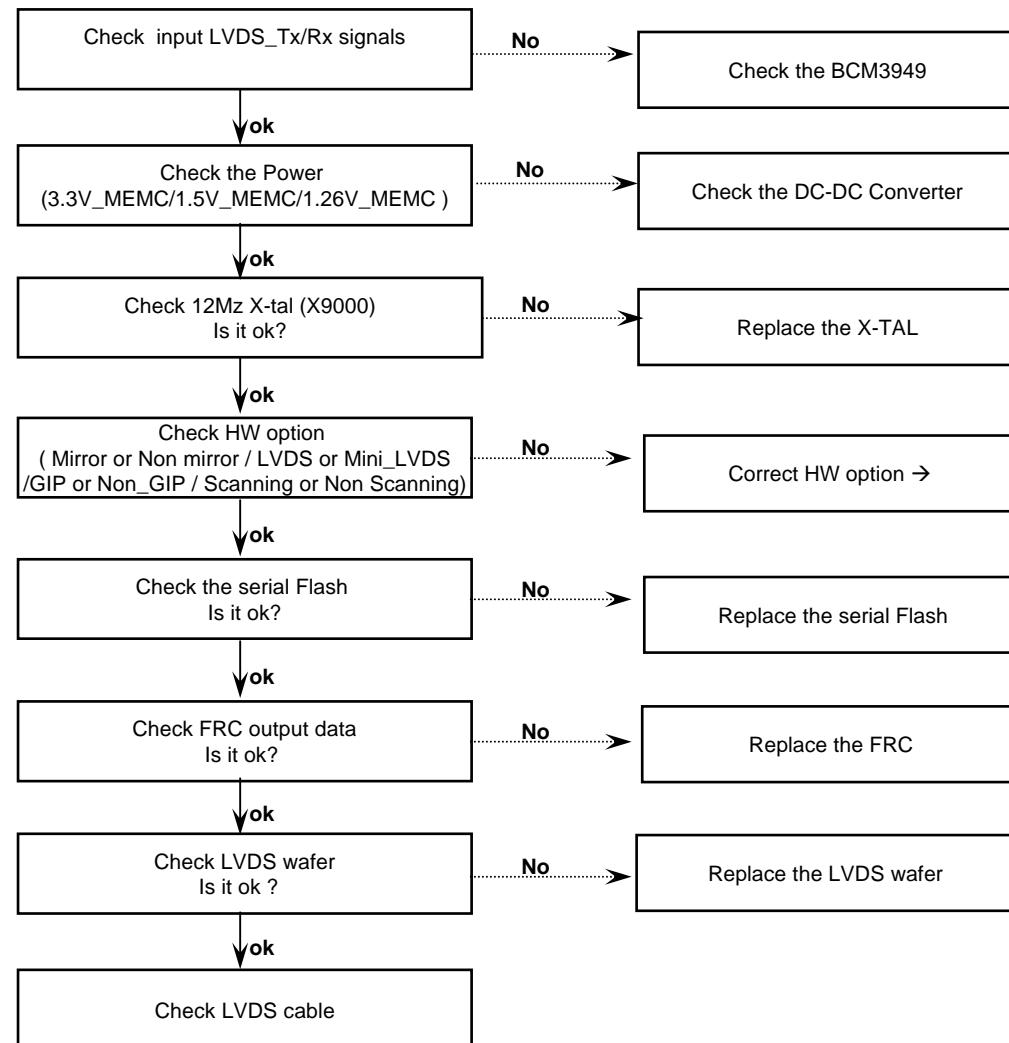
6. Trouble shooting - No video (RGB-PC)



7. Trouble shooting - No video (HDMI)

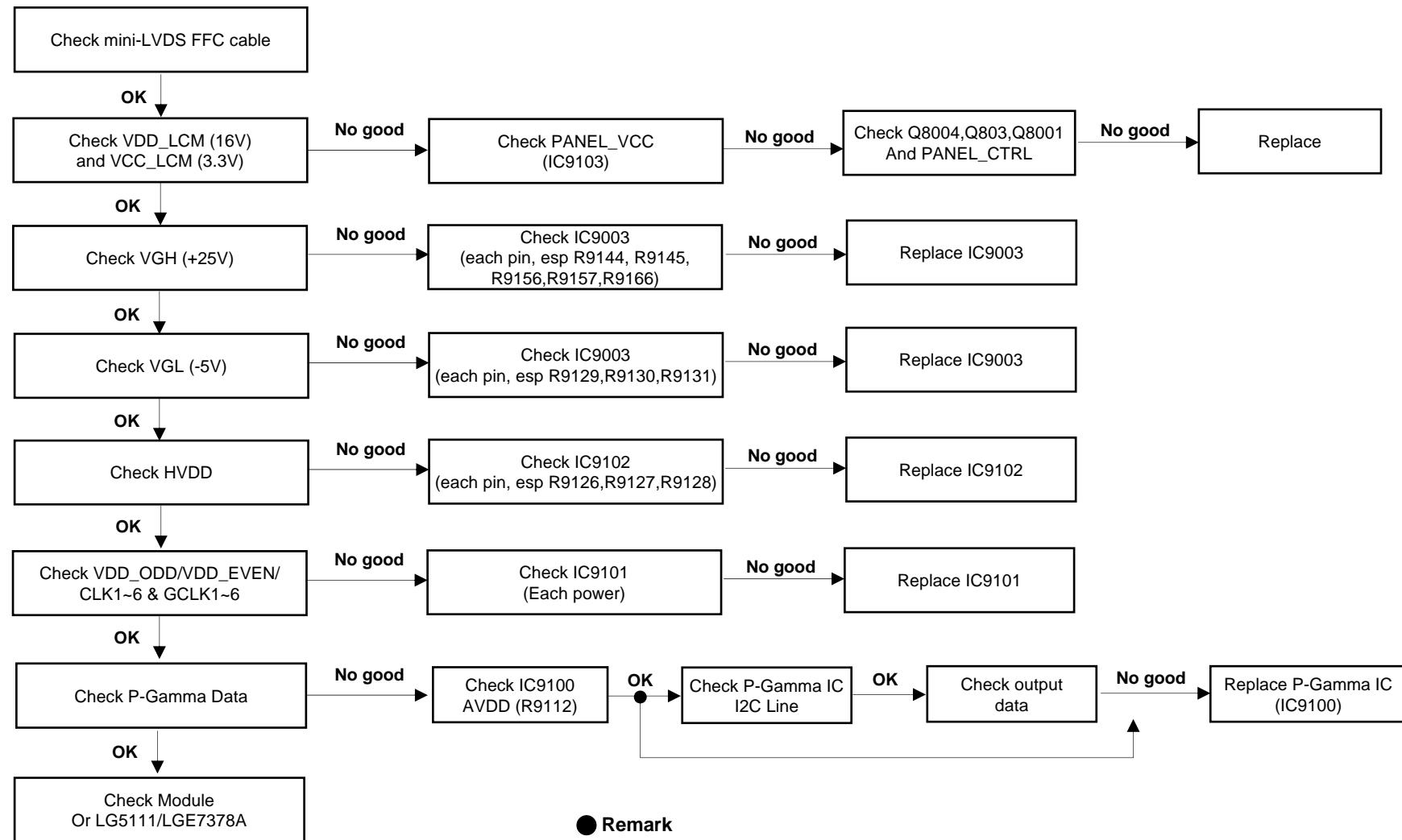


8. Trouble shooting - No video (FRC - M120Hz/TM240Hz)



FRC OPTION	K14	T10	R10	R9	U10
HIGH	MIRROR	MINI_LVDS	NON_GIP	SCANNING	NON_L.D.
LOW	NON_MIRROR	LVDS	GIP	NON_SCANNING	L.D.

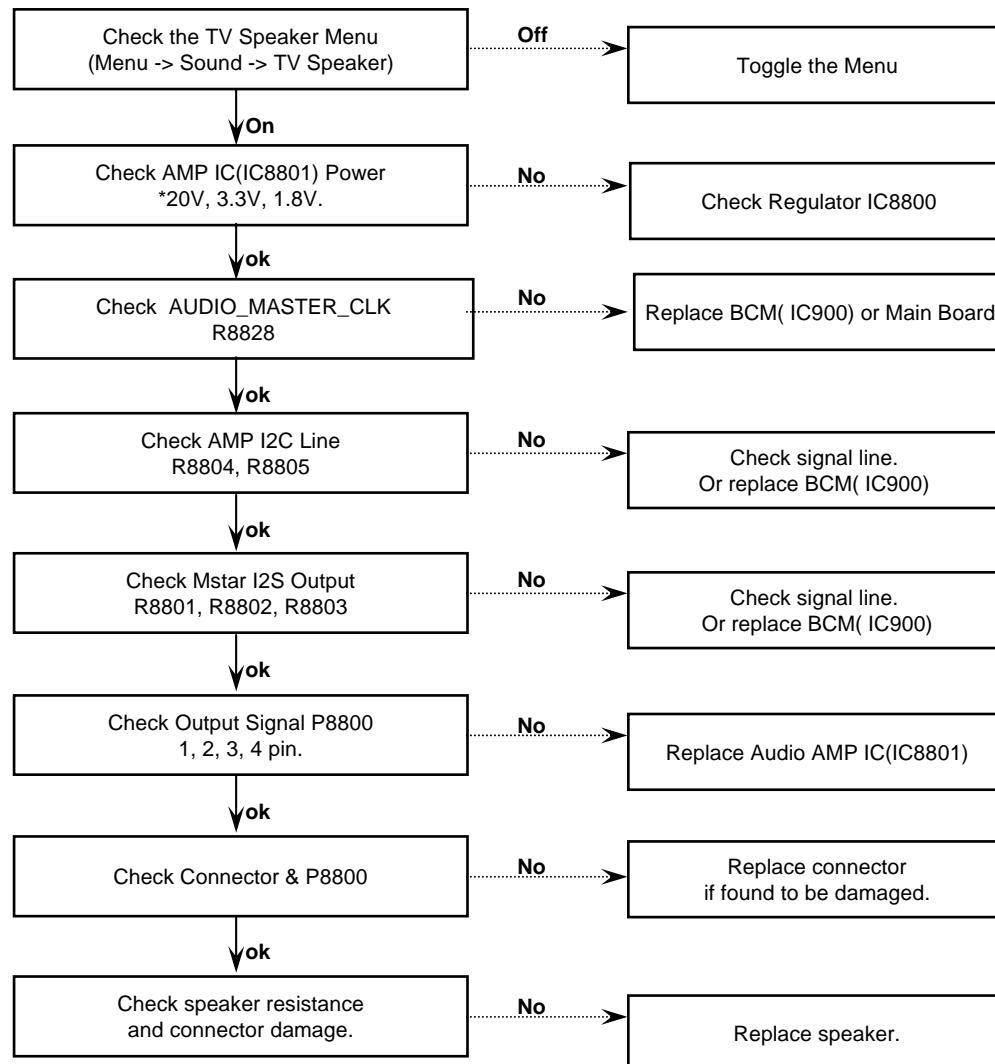
10. Trouble shooting - No video or Abnormal image (M+S block)



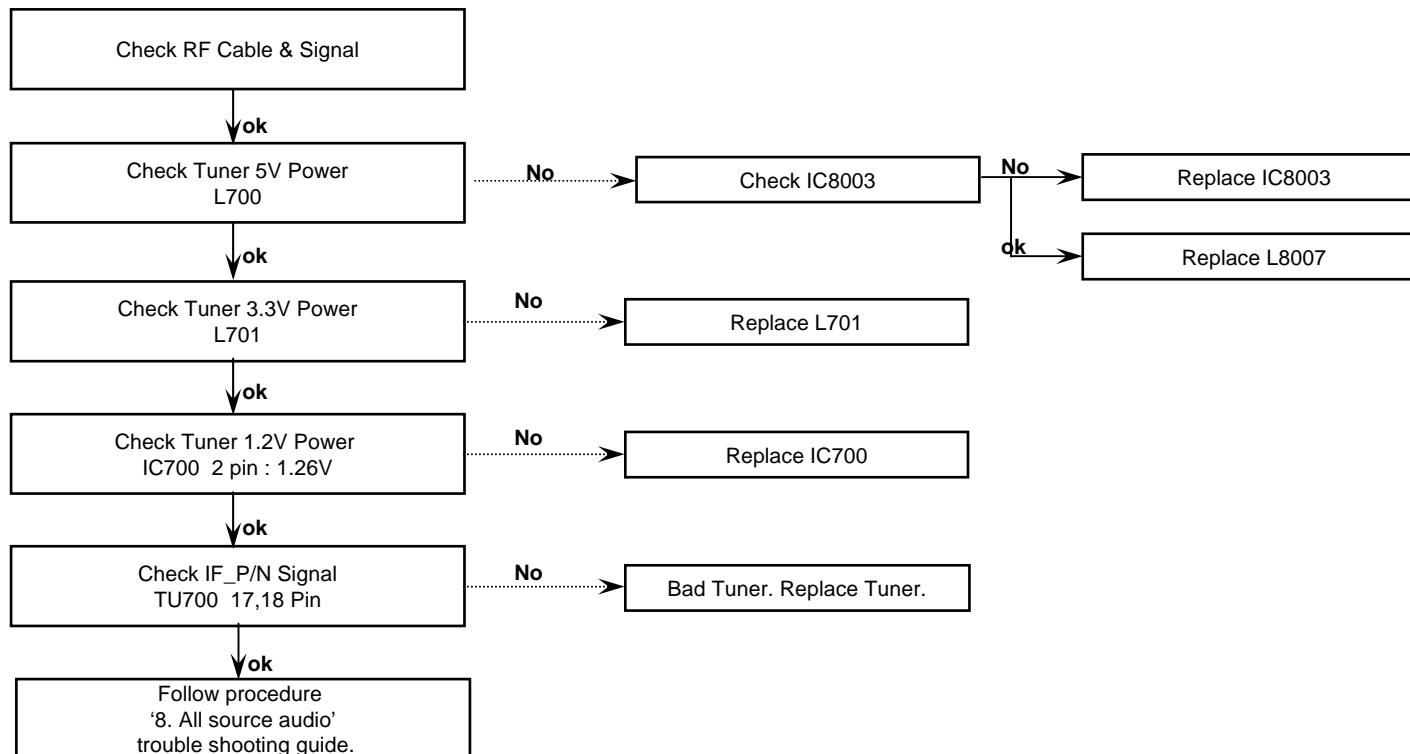
● Remark

Module			VGH (0°C)	VGH (25°C)	VGL	VDD_LCM	HVDD
42	Edge	120Hz	29.15	27.69	-5	16.25	8
47	Edge	120Hz	29	28	-5	15.5	7.7
55	Edge	120Hz	N/A	28	-5.3	16.2	7.9

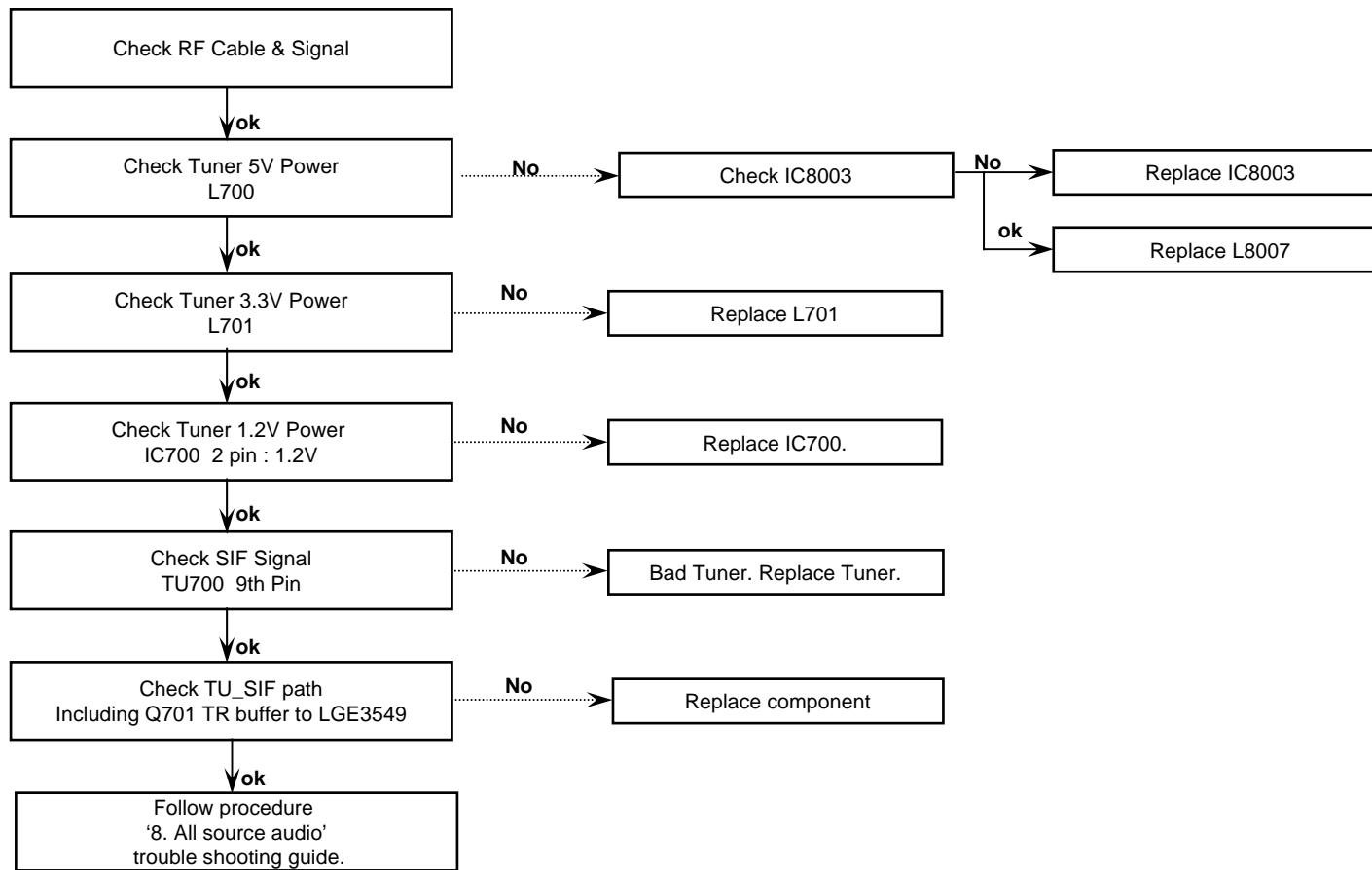
11. Trouble shooting - No Audio (all audio source)



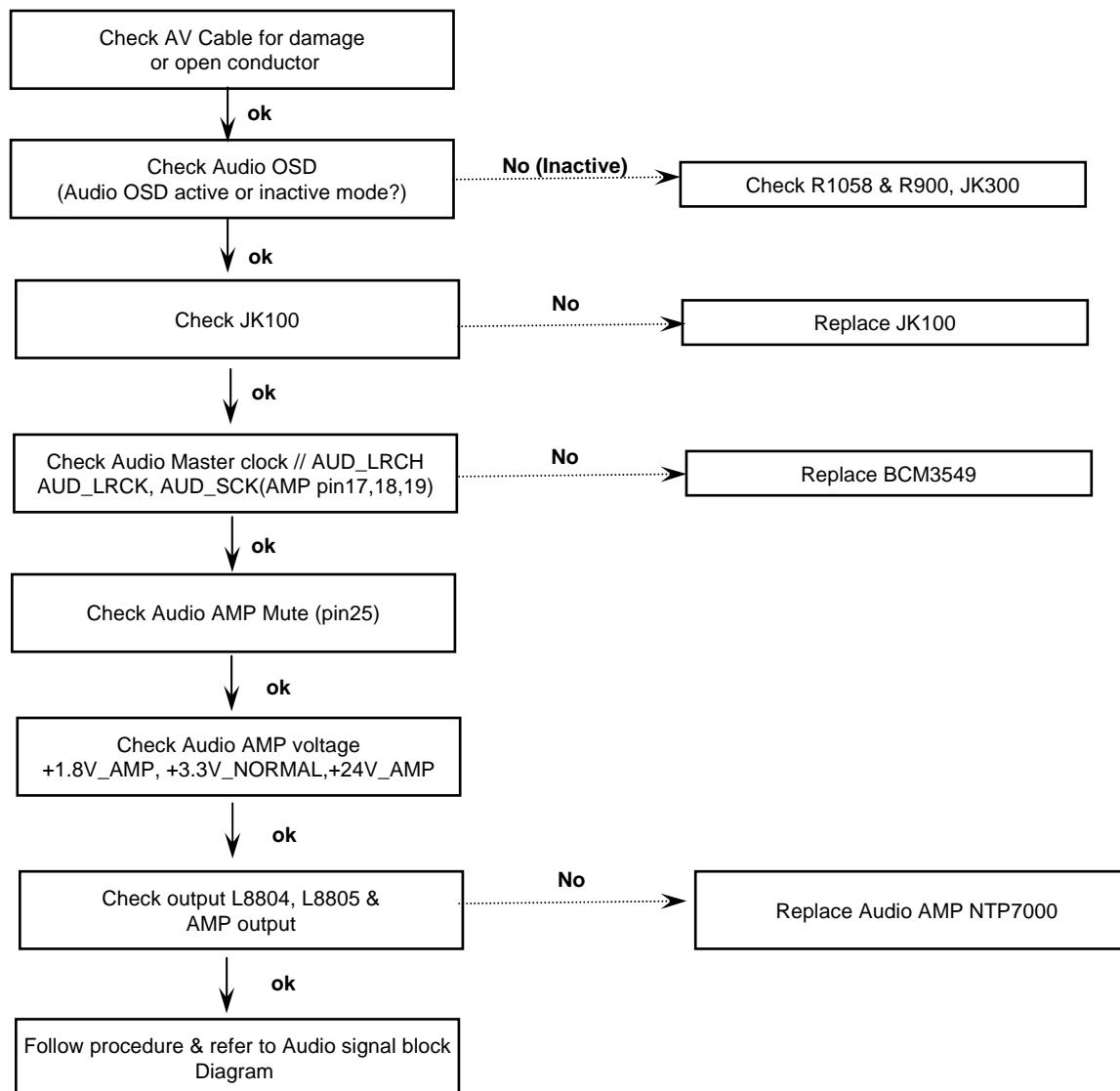
12. Trouble shooting - No audio (Digital TV audio)



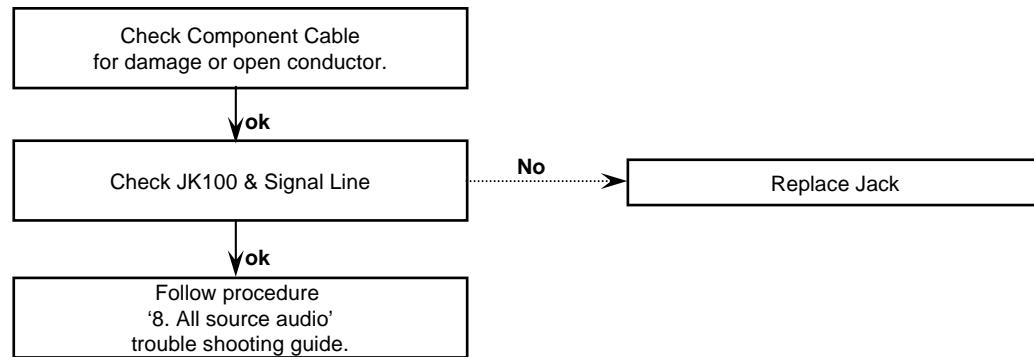
13. Trouble shooting - No audio (Analog TV audio)



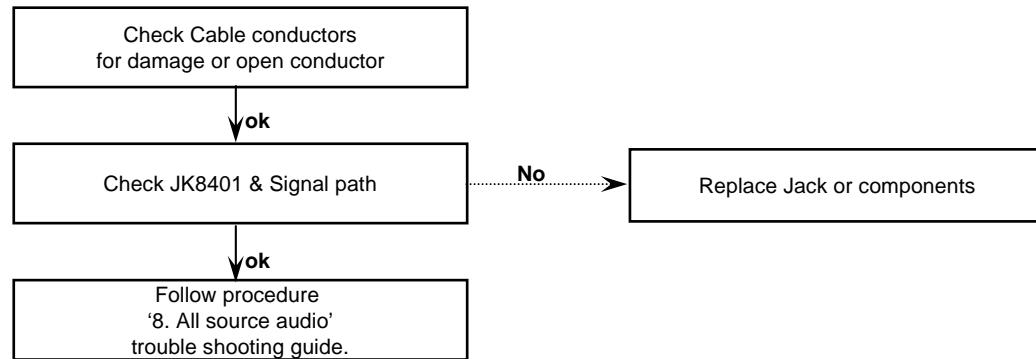
14. Trouble shooting - No audio (AV)



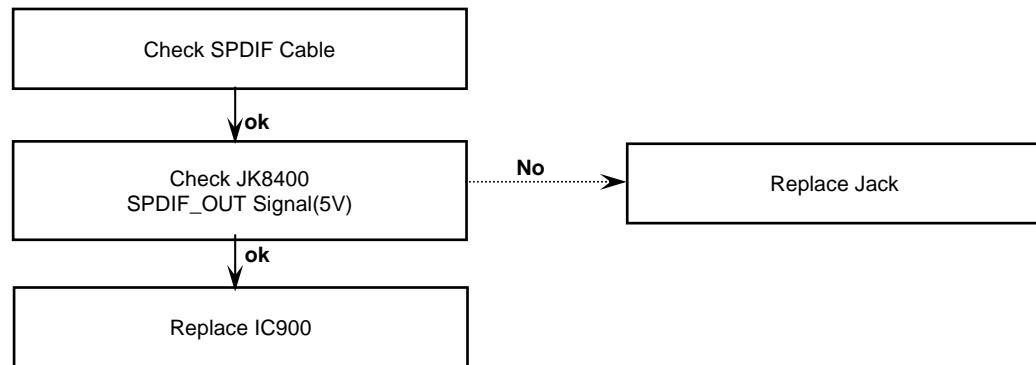
15. Trouble shooting - No audio (Component)



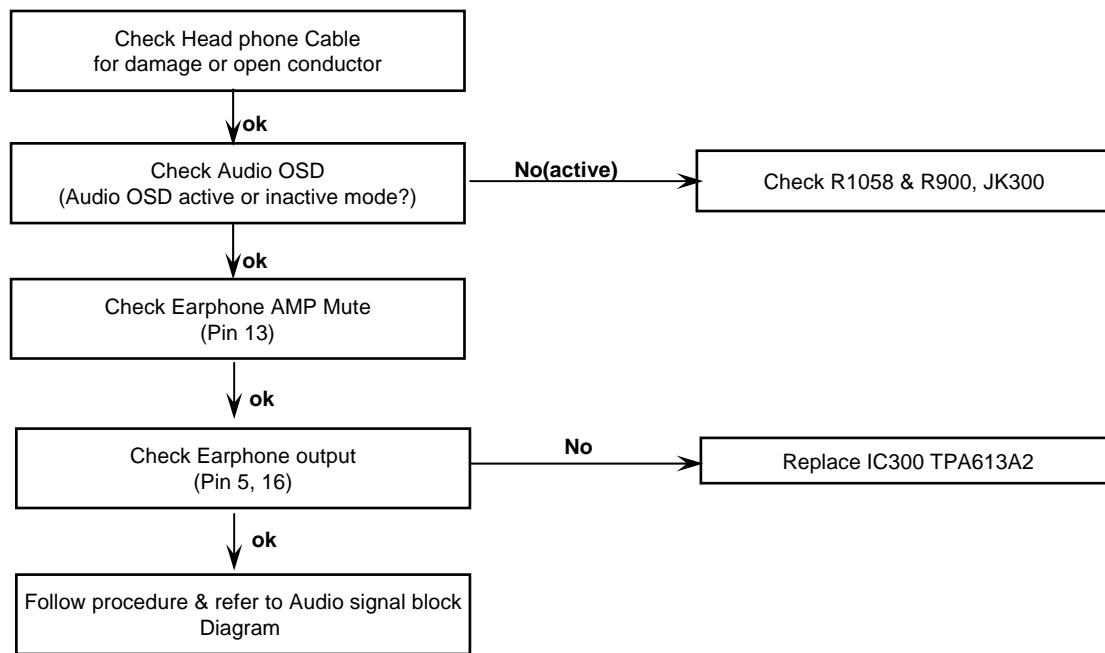
16. Trouble shooting - No audio (RGB-PC)



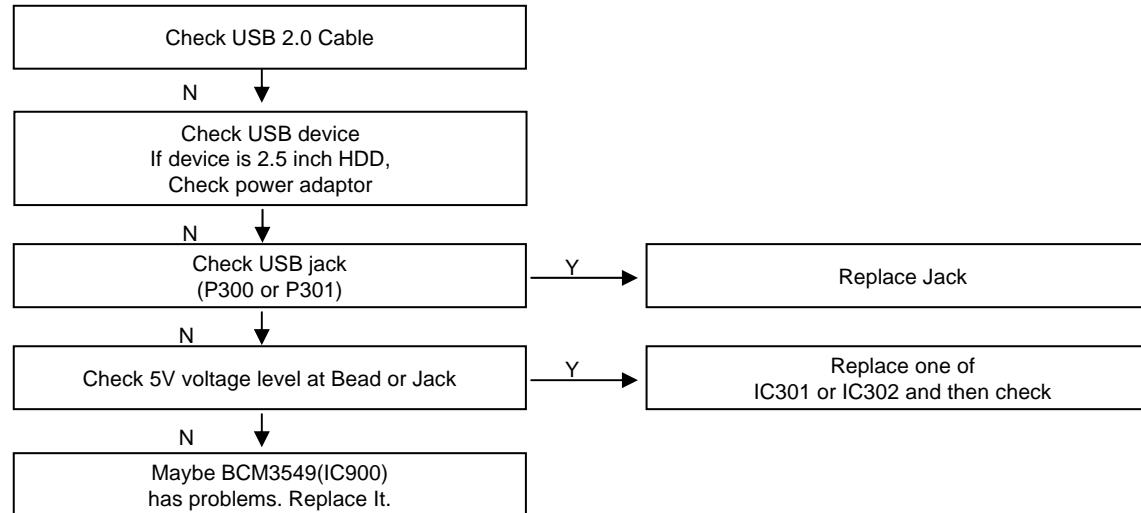
17. Trouble shooting - No audio (SPDIF)



18. Trouble shooting - No audio (Head phone audio out)

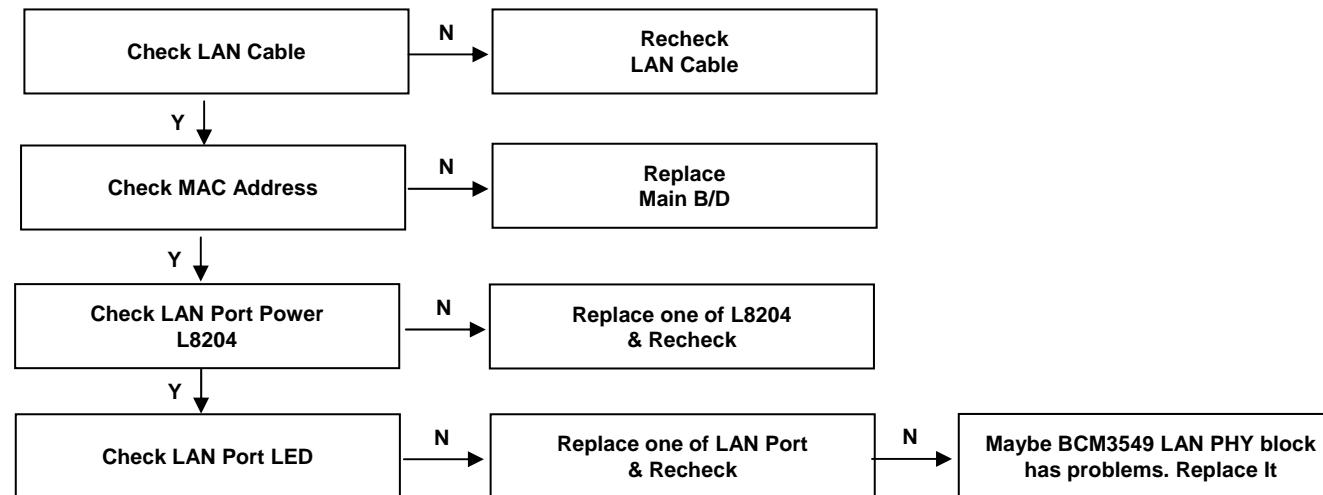


19. Trouble shooting - USB connection error

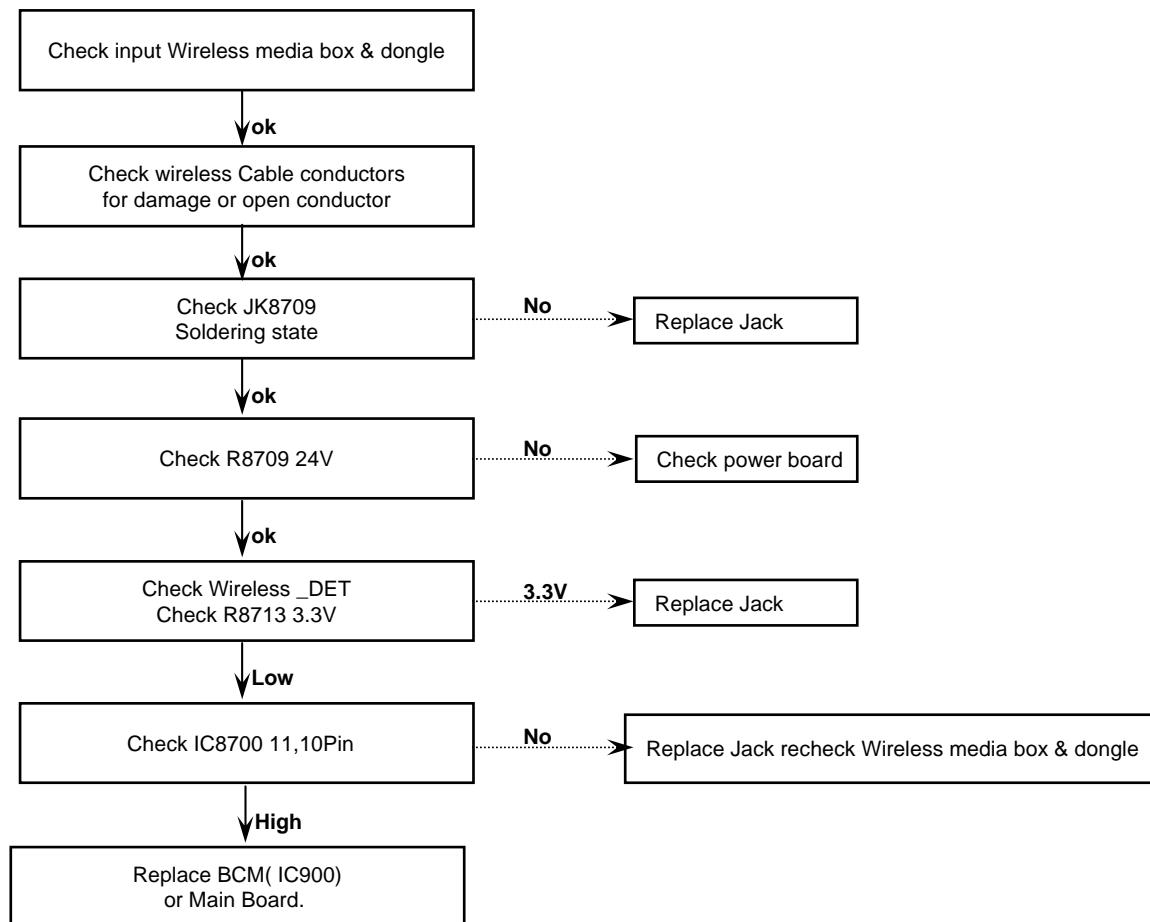


- Exception
 - USB power could be disabled by inrushing current
 - In this case, remove the device and try to reboot the TV (AC power off/on)

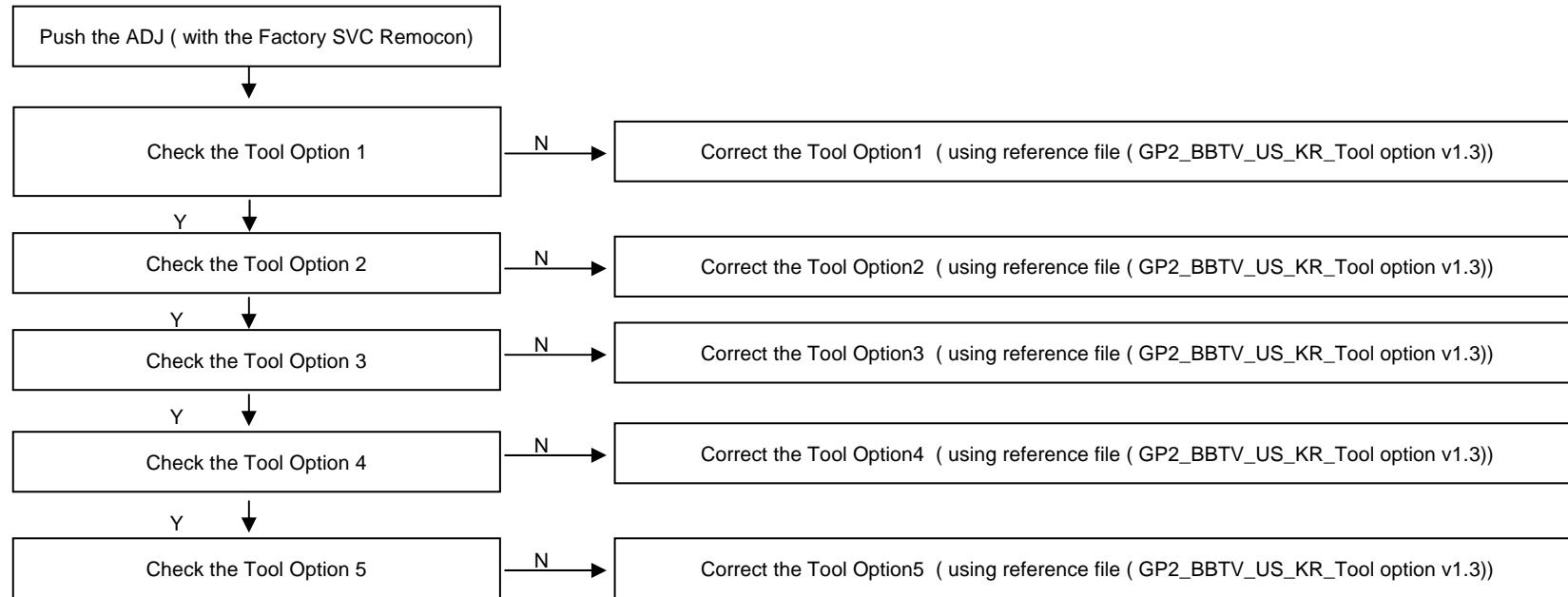
20. Trouble shooting - Ethernet connection error



21. Trouble shooting - Wireless media box - connection error



22. Trouble shooting - Tool option



Reference file : GP2_BBTV_US_KR_Tool option v1.3

23. Trouble shooting - Service Mode (INSTANT)

IN START

Model Name : GLOBAL-PLAT2
Serial Number : SKYJY1107
S/W Version : 02.05.00.01
MICOM Version : 3.01.7
BOOT Version : 1.01.62
FRC Version : 1.30
IR LED Version : c7
EDID Version (RGB) : 0.01
EDID Version (HDMI) : 0.01
Chip Type : BCM 3549
Wireless Host Ver. : 0.00.0
Wireless B/B Ver. : 0.00.0
Wi-Fi Version : 1.0
Wi-Fi Mac : 00:ED:91:C6:C7:92
MAC Address : FE:22:56:43:00:55
ESN Num. : LGE-TEST==XXXX000001FD91
Local Dimming Ver. : 0x0703
Debug Status : EVENT

UTT : 5
APP History Ver.: 26524
PQL DB : LGE_EF_LGT10_ALLxN42

1. Adjust Check ►
2. ADC Data
3. Power Off Status
4. System 1
5. System 2
6. Model Number D/L
7. Test Option
8. External ADC
9. Spread Spectrum
10. Sync Level
11. Wireless Ready
12. Stable Count
13. ODC Test
14. Local Dimming

- IN-START mode displays various TV system information and supports useful functions for engineer.
- Each of menu has sub-menus for detail set-up
- 1. Adjust Check
: Refer to next page.
- 2. ADC Data
: This menu supports manual ADC adjustment for COMP 480i/COMP 1080P/RGB.
- 3. Power Off Status
: You can check previous power-off history with this menu.
- 4 & 5 . System
: There are various sub-menus for TV system setting.
- 6. Model Number D/L
: You can change TV System's model name & Serial Number manually.
- 7. Test Option
- 8. External ADC
: You can adjust external Analog-to-Digital Converting Level when you have external devices as Master.
- 9. Spread Spectrum
: To enable FRC spread spectrum function and set detail value as spreading percent, period.

10. Sync Level
: You can control sync level of Component, HDMI input source. (Range is from 0 to 31)

11. Wireless Ready
: You can set RF Group, Media-box type and get some information about Wireless Diagnostics.

14. Local Dimming
: You can check current Local Dimming binary file version. When you upgrade latest F/W, you can re-download with using this menu.
If TV system doesn't support Local Dimming Function, you can't see this menu.

23. Trouble shooting - Service Mode (INSTART – Adjust Check)

Adjust Check	
1. Country Group (Press OK to Save)	
Country Group Code	02
Country Group	US
Country	US
2. Tool Option	
Tool Option1	33024
Tool Option2	30291
Tool Option3	56364
Tool Option4	4525
Tool Option5	1802
3. Adjust White Balance :	OK(0)
4. Adjust ADC :	OK
480i Component	OK
1080p Component	OK
RGB	OK
5. EDID(AC3) :	OK
RGB	OK (0x1D)
HDMI1	OK (0x3,0x5A)
HDMI2	OK (0x3, 0x4A)
HDMI3	OK (0x3, 0x3A)
HDMI 4	OK (0x3, 0x2A)

1. Adjust Check

: This menu displays Country Group, Tool Option and Adjust Result Information. This is very useful when you want to know about TV systems adjustment as White Balance, ADC.

1) Country Group

- You can change Country Group and Tool Option only. This change is saved real-time.

2) Tool Option

- You can change Tool Option value. Move a cursor to dialog box and push some numbers with remote-controller.

3) Adjust White Balance

- This dialog box shows the result of White Balance adjustment. OK/NG

4) Adjust ADC

- This dialog box shows the result of ADC. OK/NG
If you have external device as master, you can adjust ADC at 'External ADC' menu.

5) EDID

- This dialog box shows the status of EDID Download.

24. Trouble shooting - SW download

